

HELMINTH PARASITES (DIGENIA. TREMATODA) OF FRESH WATER FISHES OF DISTRICT KANPUR

By

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M. Sc.

THESIS SUBMITTED FOR THE DEGREE OF

Doctor of Philosophy

IN

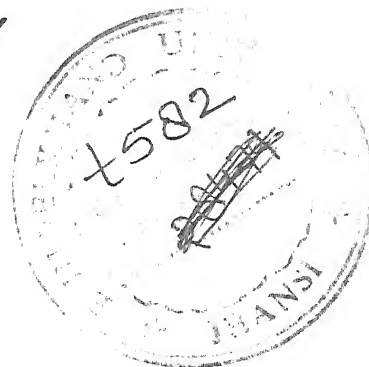
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DEPARTMENT OF ZOOLOGY
BIPIN BIHARI (P. G.) COLLEGE
JHANSI 284 001
INDIA

DEDICATED
TO MY DEAR
FATHER-IN-LAW
AND
MOTHER-IN-LAW

DEPARTMENT OF ZOOLOGY
BIPIN BIHARI (P.G.) COLLEGE
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Dated: Dec. 12, 1993

CERTIFICATE

Certified that the thesis entitled, "HELMINTH PARASITES (DIGENIA, TREMATODA) OF FRESH WATER FISHES OF DISTRICT KANPUR" submitted by Smt. Geeta Sachan, M.Sc. for the award of degree of Doctor of Philosophy in Zoology of the Bundelkhand University embodies the original piece of work done by her. She has worked under my guidance and supervision for more than twenty four months, commencing from the date of his registration.

It is further certified that the candidate has put in an attendance of over 240 days in the Department from the date of her registration for Ph.D. degree of the University as required under relevant ordinance.

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Introduction (Entitled)

" HELMINTH PARASITES (DIGENIA, TREMATODA) OF FRESH WATER FISHES OF DISTRICT KANPUR"

The Fish constitute an economically important group of vertebrates these constitute an important source of nutritive food for man from time immemorial. These have influenced human life on various ways. This has developed into a flourishing fish industry and a means of earning foreign exchange by exporting fish and fish products. Fish provides several products to serving as an important item of food and are eaten either cooked or raw. Uncooked fish deteriorate rapidly after being caught and must be consumed soon or be preserved for later use. Fish industries have developed for preserving, icing and canning of fish. The fish are preserved for exporting by smoking; Salting and freezing in ice. These are consumed in almost all the countries of the world. Fish are being used as food from the time of palaeolithic man. Fish diet provides- proteins, Fat, Vitamins, etc. Fish meals contains 13.30% protein and provides 300-1600 calories energy per gram. Moreover fishes are a good source of the food as phosphorous and oils (Body oil and liver oil) proteins and

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other inorganic element. The fishes have good ~~and~~ taste and easily digestible. Therefore, a large number of fresh water brackish and marine fishes are regularly captured in various parts of the world by using various methods such as - spears, Baited, hooks, traps and nets etc. Fish caught per year all over the world is above 350 Millions tons and provides two millions of people and only in India ~~all over~~ 15000.000 tones of fish is caught yearly. Fish is a very popular food in world. In India mostly south India, Madras, Andhrapradesh, Calcutta fish eaten in a large amount. The fish is not only edible material It's different part of fish body are used in various Industries in India. Fish liver oil industries was set up In Madras and Travancore during world war. Second important of cod liver oil. It produced in Kerela, Karnataka and Tamilnadu. It's marketed by Government oil factories. It has been estimated that India produce about 300 quintals of fish oil annually.

Fish manure is prepared from fishes which are not relished by man. When these are caught proportion more than can be consumed or if these are landed in spoiled condition such fish are sun dried and then ground. It is fish manure and provides nitrogen, calcium and phosphorous. Fish oil is prepared by boiling the fishes in water, and prepared oil is

washed in boiling salt water. Fish oil generally used in painting like lubricant, cosmetics, manufacture of candles cutting oil varnishing, soap, in leather and steel industries, pharmaceuticals linoleum rubber substitutes water proof. Compositions. Printing ink core oil etc. and fish liver oil obtained vitamin A and D. The liver oil is prepared from the shark and Rays, cods, halibut and tunas. Liver oil contained 55-75% Fat, 5-10% protein, and vitamin A & D. It considered to great medicinal value. This oil is also use in poultry forming.

Fish is use in a form of meal and cake the scrap from cannaries and small fishes not realised as food by man are dried and ground into fish meal. It is use in poultry pigs, and cattles etc. The fish are cooked in large pots containing water and washed then remove the water and dried in sun heat. This dried sterilized products use long time. It is known as fish cake. It fish meals is rich in proteins, phosphorous, calcium etc.

Fish protein is prepared by removing the fat from fish flour with dilute caustic soda solution, neutralised dried and obtained as white powder without any fishy smell. It contains eighty to ninety percent soluble protein. It is used in the

preparation of icecream, pharmaceuticals, paints, varnish ,
textiles paper and cosmetics also increasing the proteins
contain of bread and cake.

Fish flour this is actually fish manure but It is comparati-
-vely fine and of better quality. It is highly nutritive
food for human beings . It prepared commercially by solvent
extraxtion process. It is easily digested by the infants of
3-4 months. It is eated in f'arm of biscuits , bread, cakes,
sweets and soaps by mixing with wheat or Maize flour is
also treated to remove bad smell.

Liquid glue is prepared from the connective tissue of
fish skin fins and bones. The glue is used in Adhesive in
book binding , sticking , lebel's , wood, leather , and glass
and manufactured by furniture. Isinglass is high grade colleag-
-en produced from the air bladder or swim bladder of certain
fishes. viz cat fishes and carps. The air bladder and swim
bladder is firstly washed to remove the blood and other
extramatter and then outer layer is scrapped off. The scrapped
bladder is airdried and used for the preparation of purse
honey comb, book and ribbon binding it is form of a shining
white powder , used for clearing wine beet and making edible
jelley.

Fish leather - Some fishes like sharks and rays skin leather is used for covering m cord cases, Jewlboxes, scabbards and for several other ornamental purposes. After special tanning is that after removed of dermal denticles strong and highly durable leather are prepared manufacturing of parses, begs ladies shoes, boxes and suitcases etc. Because of the presence of placoid scales the skin, of shark and ray is rough but look more beautifull. It is use during war are prepared from skin of globefish. The skin of cod, salmon Hali but and other large fishes are also tanned and converted into leather.

Shagreen - The rough skin^{of} sharks used in rubbing and polishing the furniture and is called shagreen. Fish fins-of shark are exported to china. Where these are greatly appreciated for preparing soap. Fish used in pearls. the material obtained by scraping in silvery coating of the scales of certain fishes is called guanine. It is used in polishing the Hollow glass, beads these beads are then filled with wax and marketed as artificial pearls used in jewellery. For sports and games - fishing froms an important out door

game for millions of people. Various species of trout, salmon, carps and other species of fishes are used in games. Fishes use in decoration several species of beautifully coloured fishes are kept in aquaria, ponds and lakes and used for ornamentation. Biological control: several species of fishes larvivorous in habit and feed upon insect larvae: eg-chela, puntius, Berilius, Banio, colisa, Rasbora, E-somas, Ambassis, Aplocheilus etc. several diseases are spread by mosquitoes hence the larvivorous fishes are introduced in the water of the area. They feed upon larvae and help in reducing the population of mosquitoes. Evolutionary significance: the choanichthyes or crossopterygian fishes are very important as these provide evidence for the evolution of tetrapods. The land vertebrates and the lung fishes are spoken of as "the uncles of land dwellers". These are first amphibians have a common grand father having arisen from some primitive ancestral fish stock.

Certain fishes are harmful to man. Because host of certain parasites act as an intermediate host of many human parasites which help in the dispersal of many human and cattle diseases.

Fishes provide good opportunity for millions of people for the living and jobs orientation. The fish is no exception to parasitic infestation being helminthic or otherwise, the resultant effect being a concomitant loss to fish population also to man and other animals. It has become a problem to deep concern because fishes get parasitised by different helminth parasites of which trematodes infection is peculiar. Infection makes them ill developed and less nutritive. To overcome the loss of fish food, a multifacet strategy is needed. There is a great variety and diversity among the trematodes which makes the group of increased interest in studies of host relationship and speciation and phylogeny.

Fishes get parasitised by helminthes cestodes, Nematodes and Trematodes etc. Infection of Trematodes is peculiar in fishes. According to their mode of life, they are of monogenetic or digenetic. The digenetic trematodes complete their life cycle in two host first is fish and another is some water bodies like snail or other molluscs etc. After infection fishes become ill developed and less nutritive so known and unknown parasites must be investigated to check their life cycle. Their adult forms can be observed only in fish host, we already known large number of digenetic -

trematodes from fishes but our knowledge is still incomplete even in regard to the adult trematode and more inadequate in regard to their life cycle and larval stages where ever extensive survey have been made. It is seen that number of species of digenetic trematode approaches the number of species of fishes examined (Manter 1957) and survey conducted in different laboratories in India also support this view. A large number of Indian workers have worked out the trematodes fauna of fishes of various regions of country. However survey of trematodes have been made by Agarwal S.C. and Agarwal G.P., (1977-1980) Agarwal L.N. and Agarwal G.P.(1980-1982) and Dwivedi U.K. and Agarwal S.C.(1983-1986), Gupta P.C. and Govind H.(1985), and Gupta S.P.(1951), Verma B.P. and Sahay V.(1985) Ubgade and Agarwal(1980) Agarwal and Kumar(1979-1981,1985) Saxena(1959) Pandey(1970-1975) Madhavi(1978) Sharma S.K. and Agarwal S.C.(1987-1990) et al and our knowledge about trematodes is still incomplete. District Kanpur bears Ganga, Gomti rivers and ponds extensive survey of helminth parasites of fishes from the above resources and also purchased various fishes from fish market of Kanpur has been conducted from the month of February 1990 to 1993, this work comprise of only description of digenetic trematodes of fresh water fishes of Kanpur region. Therefore, in the present work entitled

"Helminth parasites of (digenetic trematodes) fresh water fishes at Kappur." An attempt has been made to describe the parasite of digenetic trematodes at Kanpur.

HISTORICAL REVIEW

Southwell (1913) described Isoparorchis trisimilitubis from Wallago attu and Puntius (Barbus) tor from Calcutta.

Southwell and Prasad (1918) described Clinostomum piscidium from Nandus nandus and Colisa (Trichogaster) fasciatus from Bengal and Poona.

Verma (1927) described Opisthorchis pedicellata from Rita rita and Bagarius bagarius (B. yarrellii). In 1936a-b, described Bucephalopsis fusiformis from Eutropiichthys vacha, B. garuai from Pangasius buehanani, Bucephalus tridentaculata from Aoria (Macrones) aoria and Aoria (Macrones) seenghala; B. aoria from Aoria (Macrones) aoria from Allahabad.

Thapar (1930) described Opisthorchis gontia (Gontia piscicola) from Bagarius bagarius (B. yarrellii) from Lucknow. In 1960, he described Caballeroia indica from Cirrhhina fulungel from Lucknow.

Srivastava (1933) described Genarchopsis (Progonus) piscicola, G. (Progonus) ovocaudatum from Channa (Ophiocephalus) punctatus; G. (Ophiocorchis) lobatum and G. (Ophiocorchis) singularis from Channa (Ophiocephalus) from Allahabad. In 1935a-c, he described Lecithaster indicus, L. extralobus from Hilsa (Clupea) ilisha, Haplorchoides (Haplorchis) attenuatum from Mystus (Macrones) seenghala, H. (Haplorchis) piscicola from Eutropiichthys vacha, H. (Haplorchis) gangeticum from Pseudotropius athenoides, H. (Haplorchis) silundi from Silondia gangetica; Faustula

(Orientophorus) brevichrus, F. (Orientophorus) gangeticus, F. (Orientophorus) ilishii and F. (Orientophorus) clupii from Hilse (Clupea) ilisha from Allahabad in 1936, Asymphyllodora indica from Channa (Ophiocephalus) punctatus from Assam; in 1937, Polyorchitrema piscicola from Eutropiichthys vacha and in 1938a-c Bucephalus indicus and B. gangeticus from Mystus (Macrones) seenghala, Bucephalopsis belonea and Phyllodistomum lewisi from Xenentodon (Belone) strongylura, Nicoliodiscus gangeticus, Orientodiscus lobatum, O. jumnai from Silondia gangetica from Allahabad, and in 1939, described Polyorchitrema piscicola from Eutropiichthys vacha from Allahabad.

Chatterji (1933) described Orientocreadium (Ganada) clariae, Masenia collata and Astiotrema spinosa from Clarias batrachus from Rangoon, in 1938, he described Protocladorchis (Maccallumia) burmanica from Pangasius pangasius from Rangoon.

Harshey (1933) described Opegaster anguilli from Anguilla bengalensis from Allahabad; in 1937 described O. mastacembeli and O. mehrii from Mastacembelus armatus from Jabalpur.

Pande (1934) described Orientocreadium indicum from Heteropneustes fossilis (Syn. Heterobranchus longifilis) and Pangasius buehanani from Allahabad; in 1937a-b, he described Allocreadium handiai from Channa (Ophiocephalus) punctatus, Pleurogenoides (Pleurogenes) pabda from Callichrous pabda; Opegaster beliyai from Gobius giuris from Allahabad; in 1938a-b, Allocreadium nicolli from Gobius giuris, A. kosia from Puntius (Barbus) chilinoideis, A. schizothoracis from Schizothorax

micropagon, and A. mahaseri from Puntius (Barbus) tor from Allahabad. Pande and Shukla (1976) described Haplorchoides pearsoni from Channa punctatus and H. mehrai from Mystus vittatus from Lucknow.

Dayal (1935) described Haplorchoides (Monorchotrema) taakree from Pseudotropius taakree from Lucknow; in 1938a-c, he described Astiotrema dassia from Clarias batrachus, Gorgotrema barbius from Puntius (Barbus) sarana, Orientocreadium (Neoganada) barabankiae from Clarias batrachus, Orientocreadium (Nizamia) hyderabadi from Channa (Ophiocephalus) punctatus, Phyllodistomum (Phyllochrous) macronius from Mystus (Macrones) tengara from Lucknow and Hyderabad; in 1948 described Bucephalopsis macronius from Mystus (Macrones) seenghala, B. sinhai from Eutropiichthys vacha, B. thapari from Pseudotropius taakree, Neobucephalopsis bagarius from Bagarius bagarius (Bagarius yerrellii) from Lucknow, in 1949 described Orientocreadium (Ganadotrema) indica from Heteropneustes fossilis, O. (Neoganada) secunda from Cluosisoma garua, Opisthorchis (Gomtia) gagatia from Gagatia cenia, O. (Gomtia) lucknowia from Bagarius bagarius (B. yarrellii), Phyllodistomum vachius from Eutropiichthys vacha H. (Plesiodistomum) callichrous from Callichrous pabda, Haplorchoides (Pseudohaplorchis) macrones from Mystus (Macrones) seenghala from Allahabad and Lucknow; in 1950 described Eucreadium eucreadium from Eutropiichthys vacha, Neopodocotyle indica from Callichrous bimaculatus from Lucknow. Dayal and Gupta (1953) described Ganeo gobindia from Wallago (Wallagonia) attu from Lucknow.

Bhalerao (1936) described Isoparorchis hyselobagri from Ambis nama, Channa (Ophiocephalus) gachua, Channa (Ophiocephalus) marulius, Channa (Ophiocephalus) punctatus, Channa (Ophiocephalus) striatus, Gobius giuris, Mastacembelus armatus, Notopterus notopterus; Lucknow; in 1937, he described Phyllodistomum sp. from Channa (Ophiocephalus) marulius, Mastacembelus armatus, Xenentodon (Belone) cancila, Helostomatis sakrei from Labeo calbasu, Cleptodiscus (Neocladorchis) poonaensis from Puntius (Barbus) debsoni, Bucephalopsis karvei from Xenentodon (Belone) cancila from Poona; in 1942 described Clinostomum dasi from Heteropneustes (Saccobranchus) fossilis and C. prashadi from an unidentified fish from Hyderabad.

Mehra (1941a-b) described Opisthorchis pedicellate minuta fr. Mystus seenghala and Wallago attu, Opisthorchis gontii from Bagarius bagarius (B. yarrellii) from Allahabad; in 1962 he described Hysterolecitha indica from Channa (Ophiocephalus) punctatus.

Kaw (1943) described Pleurogenoides (Pleurogenes) pabda from Callichorous pabda from Kashmir; in 1944 he described Crepidostomum indicum from Schizothorax niger and in 1950 described Allocreadium nemachilus from Nemachilus kashmirensis, Phyllodistomum loossi from Schizothorax socinus and Schizothorax sp., Allocreadium schizothoracis from Schizothorax sp., Clinostomum schizothoraxi from Oreinus sinuatus, Schizothorax socinus and Neascus yetastai from Oreinus sinasus, Schizothorax micropagon, Schizothorax niger and Schizothorax socinus from Kashmir.

Gupta (1950) described Allocreadium thapari from Rita rita from Hardoi; in 1951a-e, he described Cephalogonimum heteropneustus from Heteropneustes fossilis, Phyllodistomum singhiai from Mastacembelus armatus, Orientocreadium (Ganadotrema) mahendrai, O. (Ganadotrema) vermai from Clarias batrachus, O. (Ganadotrema) phillipai, Genarchopsis (Ophiocorchis) dasus, G. (Ophiocorchis) indicus from Channa (Ophiocephalus) punctatus, Orientocreadium (Macrotrema) macroni from Mystus (Macrones) cavasius from Lucknow and Saharanpur; in 1955a-b, Gauhatiana batrachii from Clarias batrachus; Masenia fossilisi from Heteropneustes fossilis; M. dayali from Clarias batrachus; Haplorchoides seenghali from Mystus (Macrones) seenghala; Polydora vittatusi from Mystus (Macrones) vittatus, Thaparotrema vittalani, Assamia gauhatiensis, Haplorchoides ritai, H. brahmputraensis from Rita rita; Brahmaputrotrema punctata from Channa (Ophiocephalus) punctatus from Assam; Neopeccoelina saharanpurensis from Mystus (Macrones) cavasius and Heteropneustes fossilis from Saharanpur. Oudhia horai from Heteropneustes fossilis from Manipur state, Allogomtiotrema (Gomtiotrema) attu from Wallago (Wallagonia) attu, Neobucephalopsis eutropichthis from Eutropichthys vacha, Haplorchoides gontiensis from Silondia gangetica; Neobucephalopsis pseudotropici, N. gauhatiensis from Pseudotropius garua, Lucknoides cavasius from Mystus (Macrones) cavasius from Lucknow; in 1958a-b, Hamacreadium (Allocreadium) kamalrai from Oxygaster (Chela) bacaila and Allocreadium lehrai from Macrognathus (Rhynchobdella) aculeata from Lucknow; in

1961 he gave a reference list of trematodes parasites of fresh water fishes of India; in 1963 described Eucreadium cameroni from Oxygaster (Chela) gora, Allocreadium makundi from Puntius (Barbus) sarana from Banaras. Gupta and Agrawal 1967a-b described Macrolecithus indicus from Puntius sophore, Asymphyiodura ritai from kita rita from Lucknow, in 1968 they described Pseudoparamacroderoides seenghali from Mystus (Macrones) seenghala from Lucknow. Gupta and Chakravarty (1967) described Neopodocotyle lucknowensis from Puntius (Barbus) sarana from Lucknow. Gupta and Verma in 1977 described Allocreadium mrigalai from Cirrhhina mrigala; A. saranai from Puntius (Barbus) sarana, A. baranai from Barilius barana and Asymphyiodora punctatusi from Channa (Ophiocephalus) punctatus from Lucknow.

Srivastava (1951a-b) described Asymphyiodora kedari (Syn. A. tincae) from Puntius sophore, Eumaseia moradabadensis from Heteropneustes fossilis from Hardoi and Moradabad respectively.

Singh (1959) described Echinostoma thapari from Notopterus chitala from Lucknow, in 1957 he described Diplostomum elongatus from Trichogaster fasciatus.

Chatterji (1957) described Haplorchoides (Haplorchis) parini from Wallago attu and Polyorchitrema entropionti from Eutropiichthys vacha from Rangoon.

Jaiswal (1957) described Phyllodistomum parorchium from Gobius giuris, P. indicum from Heteropneustes fossilis, Phyllodistomum sp. from Labeo fimbriata, Clinostomum macrosomium from Channa (Ophiocephalus) striatus, C. mastacembeli from

Mastacembelus armatus, Euclinostomum channai from Channa (Ophiocephalus) marulius, Echinostomum heptacaecum from Channa (Ophiocephalus) punctatus, Orientocreadium (Neoganada) barabankiae from Clarias batrachus, Haplorchoides attenuatum from Mystus (Macrones) tengara; in 1967 Derogenes hyderabadensis from Channa (Ophiocephalus) punctatus from Hyderabad. Jaiswal and Narayan (1971) described Azygia marulii from Channa (Ophiocephalus) marulius from India.

Saxena (1958a-b) described Orientocreadium raipurensis, O. dayalai from Clarias batrachus, Allocreadium spindale from Mastacembelus armatus from Raipur; in 1960 he described Orientocreadium umadasi from Clarias batrachus from Raipur.

Agarwal (1959) reported Opisthorchis pedicellata (O. mehrai, O. thapari) from Rita rita and Wallago attu from India. Tiwari (1959) described Eurostomum armati from Mastacembelus armatus.

Srivastava (1960a-b) described Emoleptalea loossi and E. dollfusi from Heteropneustes (Saccobranchus) fossilis and Allocreadium ophiocephali from Channa (Ophiocephalus) punctatus from Raipur.

Gupta and Srivastava (1960) described Faustula chauhani from Hilsa ilisha from Allahabad.

Motwari and Srivastava (1961) described Phyllodistomum chauhani from Mystus oar and Mystus (Osteobagrus) seenghala, Phyllodistomum tripathi from Bagarius bagarius from India.

Rai (1962) described Allocreadium dollfusi, A. singhi, A. hirnai from Puntius (Barbus) tor from Hiran near Katangri and Sihora in India; in 1964 he described Azygia stunkardi from Channa (Ophiocephalus) striatus from Jabalpur.

Srivastava (1962a-b) described Rhynchocreadium aculeatum from Mastacembelus (Rhynchobdella) aculeata, Pycnadena komiai from Oxygaster gora from India; in 1963a-b, he described Bucephalus bagarius, B. allahabadensis, B. tritentacularis from Bagarius bagarius, Folliorchis vermai from Eutropiichthys vacha from Allahabad and Bhagalpur; in 1968 Nicolla (Crocrocaecum) allahabadensis from Mastacembelus armatus and Anguilla bengalensis N. (Crocrocaecum) C. indicum and opegaster Jamnica from A. bengalensis from Allahabad.

Srivastava and Ghosh (1967) described Paramacrolecithus rasborai from Rasbora rasbora from Assam; in 1972 he described Birendralebes krishnakanta from Ambassis nama and A. ranga from Dhakuria lake, Calcutta. Srivastava and Singh (1967) described Eucreadium jhingarani from Puntius chagunio from river Sone, Bihar.

Agrawal (1963) described Masenia vittatusia and M. gomia from Mystus vittatus from Lucknow; in 1964a-b, he described Prosotocus mastacembeli from Mastacembelus armatus, Allocreadium heteropneustusius from Heteropneustes fossilis, Haplorchoides macronis from Mystus (Macrones) seenghala, Eumaseia ritai from Rita rita from Lucknow; in 1966 Genarchopsis punctati from Channa (Ophiocephalus) punctatus, Bucephalopsis garuai and Phyllodistomum tripathi from Pseudotropius garua from Lucknow.

Simha and Pershad (1964) described Azygia asiatica from Channa (Ophiocephalus) punctatus from Hyderabad.

Kakaji (1968) described Pleurogenoides (Pleurogenes) attui from Wallago (Wallagonia) attu from Lucknow; in 1969a-b, he described Bucephalus octotentacularis from Wallago (Wallagonia) attu, Cephalogonimus seenghalus, Orientocreadium (Macrotrema) seenghali and Genarchopsis cameroni from Mystus seenghala, Allocreadium catlai from Catla catla, Pseudoparamacroderoides vittatusi from Mystus vittatus from Lucknow and Genarchopsis cuchiai from Amphipnous cuchia from Muzaffarnagar. Allocreadium fasciatusi from Colisa (Trichogaster) fasciatus from Lucknow and A. guptai from Rita rita from Varanasi.

Sircar and Sinha (1969) described Neopodocotyle spinipora from Rita rita; in 1970 he described Masenia ritai from Rita rita from Patna.

Dwivedi (1970) described Branamputrotrema batesia from Channa (Ophiocephalus) punctatus from Jabalpur; in 1976 he described Coitocaecum orientalis from Nandus nandus from Jabalpur. Gupta and Kumari (1970a-f) described Opisthorchis pedicellata from Mastacembelus armatus, Helostomatis cirrhini from Labeo dero and Cirrhinus mrigala, Roparhynchus nelsoni from Xenentodon cancila, Hamacreadium manteri from Oxygaster (Chela) bacaila, Chelatrema smythi from oxygaster (Chela) bacaila from Kopar, Nagal, India.

Pandey (1970) described Eucreadium gangi from Colisa (Trichogaster) fasciatus from India; in 1972 he described

Tetracotyle lali from Puntius ticto, Orientocreadium batrachoides from Channa punctatus and Phyllodistomum vachius from Heteropneustes fossilis from Lucknow; in 1973 described Neopodocotyle balliaensis from Labeo calbasu and N. dayali from Puntius sarana from India.

Hai (1971a-b) described Opisthorchis gorakhpurensis from Mystus vittatus, Neopodocotyle mehrai from a fresh water fish Puntius sophore and P. sarana from Gorakhpur.

Agerwal and Verma (1972) described Eucreadium varanasi from Oxygaster (Chela) gora from Varanasi; in 1981 they described Faustula makundi and F. indica from Hilsa (Clupea) ilisha from Varanasi.

Gupta and Sharma (1972) described Fellocovitellosum indicum from Xenentodon (Belone) belone, Steganoderma indicus from Xenentodon (Belone) cancella from Katanagiri.

Verma (1973a-b) described Stomachicola mastacembeli from Mastacembelus armatus, Eucreadium guptai from Oxygaster (Chela) bacaila, Astiotrema heteropneustusi from Heteropneustes fossilis and Helostomatis indica from Barilius barana from Lucknow.

Fotedar and Dhar (1974) described Allocreadium from Schizothorax niger from Kashmir.

Chauhan (1975) described Bucephalopsis chauhani and B. gaurii from Xenentodon cancella from India.

Dhar (1975) described Astiotrema fotedari from Labeo dero from Kashmir. Dhar and Kharoo (1984) described Allocreadium fotedari from Schizothorax niger from Kashmir.

Dwivedi (1975) described Opedunculata armatus from Mastacembelus armatus from India; in 1978 he described Coitocaecum orientalis from Nandus nandus from India. Dwivedi and Dwivedi (1982) described Opedunculata sapani from Mastacembelus armatus.

Singh and Sinha (1975) described Asymphylogora longicaeca (Syn. A. tincae) from Puntius sarana and Phyllodistomum longicephalus from Setipinna phasa from Bihar; in 1976 they described Rhipidocotyle vachius from Eutropiichthys vacha from Bihar; in 1977a-b Bucephalus tetratentacularis from Sciaena coitre and other two species from fresh water fishes of Bihar.

Kumari and Srivastava (1975) described Pycnadena bariliusi from Barilius gatensis from Calcutta.

Karyakarte and Yadav (1976) described Godavaritrema indica from Mystus (Macrones) seenghala from Katanagiri.

Lal (1976) described Jamunatrema indica from Channa punctatus from Patna.

Agarwal and Kumar (1977) described Faustula varanasiensis from Hilsa (Clupea) ilisha; in 1979 they described Eucreadium thapari from Oxygaster (Chela) bacaila from Gorakhpur; in 1981 Gangatrema chauhani from Mastacembelus armatus from Varanasi; in 1983a-b Pleurogenoides anabasi from Anabas testudineus and Pseudoparamacroderoides raychaudhurii from Mystus vittatus from Varanasi; in 1985 Bucephalus purshottami and B. bharetica from Bagarias bagarius from Varanasi; in 1986 Neopodocotyle gorakhpurensis from Amphipnous cuchia from Gorakhpur; in 1987 Opisthorchis dayali from Rita rita from Varanasi.

Madhavi (1978) described life history of Genarchopsis goppo from Channa marulius.

Nama (1978) described Hemipera ovocaudata from Channa punctatus from India

Agarwal and Agrawal (1979) described Orientodiscus mastacembeli, from Mastacembelus armatus, in 1980a-d they described Masenia yamagutii, Gangatrema ritai from Rita rita and Orientodiscus orchhaensis, Helostomatis bundelkhandensis from Mastacembelus armatus from Jhansi in 1988 Dactylostomum jhansiensis from Mastacembelus armatus from Jhansi.

Agarwal and Agarwal (1979) described Bucephalus indica from Bagarius bagarius from Raipur.

Bhadoria and Dandotia (1979) described Opisthorchis gwaliorensis from Bagarius bagarius and Opisthorchis spinutum from Wallago attu from Gwalior. Dandotia and Bhadoria (1979) described Bhramputrotrema gwaliorensis from Puntius sophore from Gwalior.

Singh and Prashad (1979) described Stylotrema multivitellaria from Mystus striatus from Patna.

Agarwal and Agrawal (1980) described Neopodocotyle kulpaharensis from Channa punctatus from Kulpahar (District, Hamirpur); in 1981 they described Neoeucreadium mahobaensis from Oxygaster bacaila from Mahoba (District Hamirpur); in 1982 Bundelatrema orchhaensis from Puntius sarana from Orchha (District Tekamgarh); in 1984 Eucreadium kulpaharensis from

Channa punctatus from Kulpahar (district Hamirpur).

Agarwal and Singh (1980) described Opisthorchis thapari from Bagarius bagarius from Lucknow; in 1981 they described Transversotrema chauhani from Nandus nandus from Lucknow.

Gupta and Puri (1980) described Allocreadium calbasii from Labeo calbasu, A. manteri from Anabas testudineus and Polyorchitrema inglisi from Eutropiichthys vacha.

Kalyankar and Deshmukh (1980) described Allocreadium indicum from Labeo rohita from India.

Kumar and Agarwal (1980) described Oudhia hardayali from Mystus vittatus from Varanasi; in 1985 they described Faustula hilsei and F. pyriformis from Hilsa ilisha from Varanasi.

Agrawal (1980) made a survey of Helminth parasites (Digeneic trematodes) of fishes of Bundelkhand region. Agrawal and Agarwal (1983) described Neopodocotyle chauhani from Puntius sarana from Jhansi; in 1984 they described Cephalogonium hanumanthai from Mystus vittatus from Jhansi and a note on the validity of certain species of Eucreadium Dayal, 1942; in 1988 Dactylostomum harishii from Mastacembelus armatus from Jhansi. Agrawal and Sharma (1988) described Nicolla fotedari from Rita rita from Jhansi, in 1989a-b Paradictinogryptus jhansiensis from Channa marulius from Jhansi. Nicolla ritai from Rita rita from Jhansi.

Gupta and Govind (1983) described Eucreadium hemlatae from Chela gora; in 1985 they described Haplorchoides kerei from

Rita rita, H. srivastavai from Wallago attu, H. piscicola Srivastava from Mystus vittatus from Kanpur. Gupta and Singh (1985) described Astiotrema gangetica from Clarias batrachus from Kanpur.

Srivastava, Saxena and Kumar (1983) described a Eucreadium pandeyi from a fresh water eel, Mastacembelus armatus from Doon valley.

Tewari (1983) described Oudhia hanumanthai from Rita rita from Meerut.

Agrawal and Agarwal (1984) described Oudhia kanungoi from Rita rita; Pseudoparamacroderoides keni from Mystus vittatus from Kulpahar (District Hamirpur).

Mehra, Dhar and Kheroo (1984) described Hysterolecitha ophiocephali from Ophiocephalus punctatus.

Ahmad (1984) described Satyapalia guptai from Rita rita, S. magnous from Wallago attu, S. thapari from Mystus (Macrones) seenghala and S. vinodae from Clarias batrachus from India.

Gupta and Saxena (1985) described Opisthorchis thapari from Mystus (Macrones) oar from India.

Verma and Sahay (1985) described Genarchopsis avitellarium from Channa (Ophiocephalus) punctatus from Ranchi.

Maurya and Agarwal (1988) described Bucephalus gangai and B. dasashwamedhai from Mystus oar; in 1989 they described Opedunculata kashiensis from Mastacembelus armatus and Pseudoparamacroderoides varanasiensis from Mystus vittatus, Bucephalus varanasiensis from Bagarius bagarius and B. aori from Mystus oar.

Agrawal and Sharma (1989) described Gangatrema ritai from Rita rita (Ham.) at Rath Hamirphur; Allocreadium duknwaai from Rita rita (Ham.) at Jhansi; Pychadena indica & Pychadena betwai from Channa marulius (Ham.) at Jhansi. Allocreadium dograi from Mastacembelus armatus (Lac.) from Dograi Dam at Jhansi, redescribed Genorchopsis camerono from Mastacembelus armatus at Jhansi. In (1990) Pseudoarpidogaster betwai from Tor tor (Ham) at Jhansi. Neodicrocoelium gyprasadai from Channa marulias (Ham.) Pyrenadena linton from Tor tor at Jhansi. In (1991) Pseudoorientodiscus laxmibaii from Pantius sarana (Ham.) at Jhansi.

Lokhande (1990) described Podocotylaidus dorabus from marine fish cynoglossus ologolepis in India.

Zdzitowiecki, Krzysztof (1990) Redescribed Discoverytrema morkowskii Ghson (1976) and discription of Discoverytrema gibsoni from H. fossilis (Bloch.).

Gupta and Jain (1991) described Uterovesiculurus skrjabin from marine fish at Bay of Bengal, In (1992) described Eugraulitrema hamiltoni from marine fish Engraulis hamiltoni (Cuv. & Val.) at Orissa, India.

Maurya and Agarwal (1992) described Bucephalus bear from Bagarius bagarius at Varanasi, India.

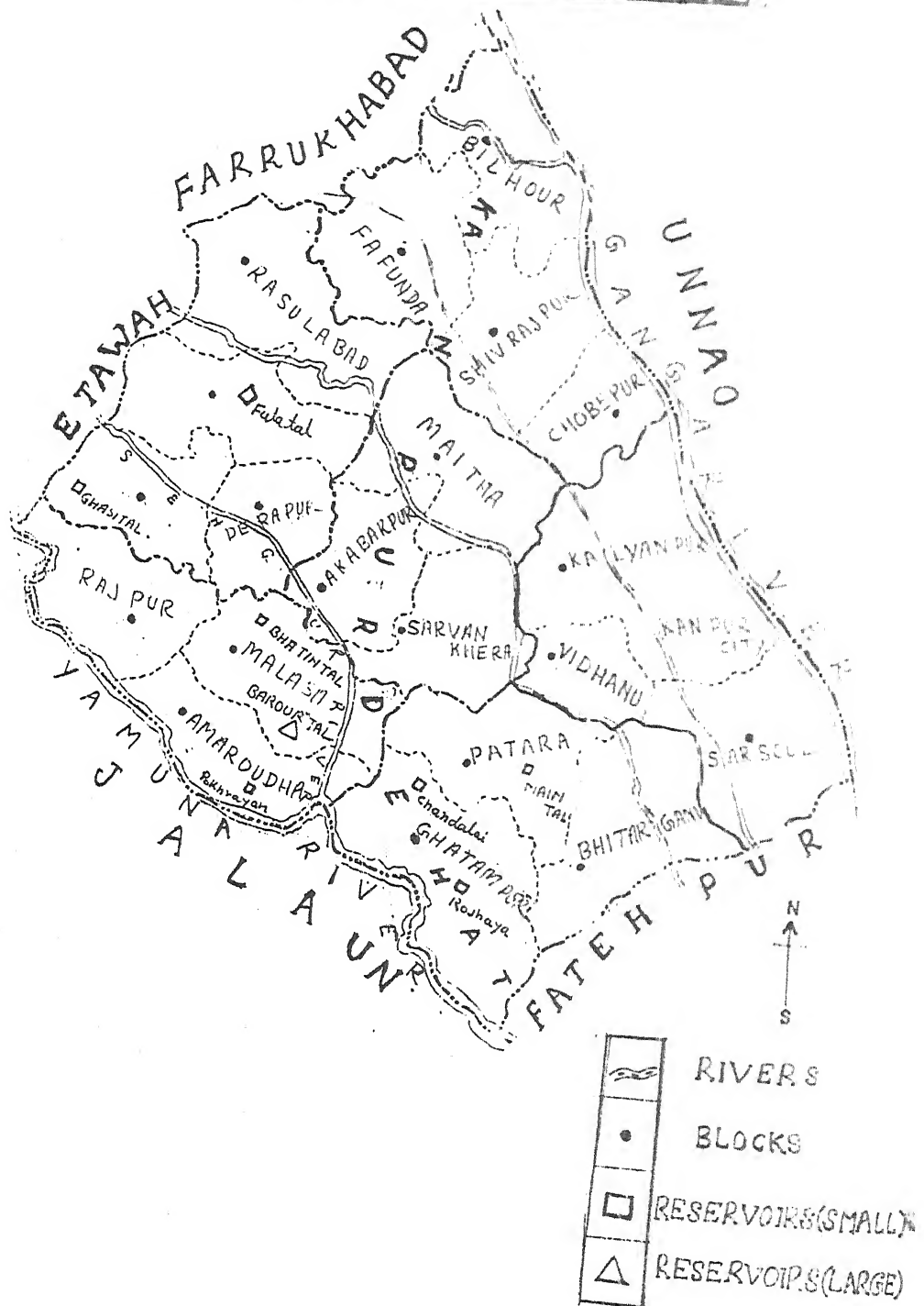
Sujatha and Madhavi (1993) described comparison of digenean faunas of sillaginid fishes from inshore and offshore waters of Visakhapatnam Coast, Bay of Bengal (India).

MATERIAL AND METHOD

The material incorporated in the present thesis has been obtained from the fresh water fishes of district Kanpur of Uttar Pradesh (India). The fishes were collected from river Ganga, river sengar, fish market Ghatampur, Rojhaya tal, Chandalai tal, Ghatampur, Bhatintal Malasa, Baraurtal malasa, Ghasin tal, Main tal Patara, Phokhrayan tal, Sukhai tal, Pokhrayan, Amraudha, and also those purchased from local fish markets.

For the collection of digenetic trematodes the eyes and visceral organs viz. heart, gut, kidney, liver, air bladder, intestine, stomach, etc. of the fish were taken out and kept separately in petridishes, contents, decanted the water several times and trematodes were collected by fine glass dropper. The trematodes were fixed in 70% or 90% alcohol, under coverglass with gentle pressure for 24 hours. Whole mounts were stained in aceto-alum carmine cleared in clove oil/xylene and mounted in Canada balsam. Mounted slides were dried in incubator maintained at 37°C. All the measurements were taken in millimeter (m.m.), from the mounted specimens by using oculometer and stage micrometer slide. Sketches were made with the help of Camera lucida.

DISTRICT KANPUR



MAP OF THE DISTRICT KANPUR

HOST PARASITIC LIST

S. No.	Host	Locality	Parasites	Location
Family : Belonidae				
1.	<u>Xenentoden</u> <u>cancila</u> (Ham.)	Fish market. Kanpur	x	x
Family : Cyprinidae				
2.	<u>Catla catla</u> (Ham.)	Fish market Kanpur	x	x
3.	<u>Cirrhinus</u> <u>mrigala</u> (Ham.)	Fish market Kanpur, Ghatampur ponds Chandali, Roochhayatal Ghatampur	x	x
4.	<u>Labeo</u> <u>calbasu</u> (Ham.)	Fish market Ghatampur	x	x
5.	<u>Labeo</u> <u>gonius</u> (Ham.)	Fish market Kanpur Fish market Pokhrayan	x x	x x
6.	<u>Labio rohita</u> (Ham.)	Fish market Kanpur	<u>Neopodocotyle</u> <u>laxmibaici</u> n.sp. <u>Neopodocotyle</u> <u>hunumanthai</u> n.sp.	Intestine
7.	<u>Oxygaster</u> <u>bacaila</u> (Ham.)	Fish market Kanpur	<u>Eucreadium</u> <u>satpali</u> n.sp.	Intestine
8.	<u>Oxygaster</u> <u>gora</u> (Ham.)	Fish market. Kanpur	x	x

- | | | | | |
|-----|---------------------------------|---|---|---|
| 9. | <u>Puntius sarana</u>
(Ham.) | Fish market
Kanpur,
Fish market
Ghatampur | <u>Apocreadium maxicanum</u>
<u>Pseudooriento-discus sengurai</u>
n.sp. | Intestine

Intestine |
| 10. | <u>Puntus sophore</u>
(Ham.) | Fish market
Kanpur,
Fish market
Kanpur,
Fish market
Kanpur | <u>Prosorhynchoides karvai</u>
<u>Prosorhynchoides garvai</u>
<u>Allocreadium thaprai</u> | Intestine

Intestine

Intestine |
| 11. | <u>Tor tor</u>
(Ham.) | Fish market
Kanpur,
Fish market
Kanpur | <u>Allocreadium kosia</u>
<u>Allocreadium fasciatusi</u> | Intestine

Intestine |

Family : Mastacembelidae

- | | | | | |
|-----|--|---|--|--|
| 12. | <u>Mastacembelus armatus</u>
(Lac.) | Fish market
Kanpur,
Fish market
Kanpur,
Fish market
Kanpur | <u>Macradenina mestacembeli</u>
<u>Macradenina thaprai</u>
<u>Nicolla chauhani</u> | Stomach
n.sp.
Stomach
n.sp.
Intestine
n.sp. |
| 13. | <u>Nandus nandus</u>
(Ham.) | Sukhai Tal
Pokhrayan | x | x |

Family : Notopteridae

- | | | | | |
|-----|--|--|------------|------------|
| 14. | <u>Notopterus notopterus</u>
(Ham.) | Rojhaiya Tal
Ghatampur
Fish market
Kanpur | x

x | x

x |
|-----|--|--|------------|------------|

Family : Ophiocephalidae

- | | | | | |
|-----|----------------------------------|--|--|--|
| 15. | <u>Channa marulius</u>
(Ham.) | Fish market
Kanpur

Fish market
Kanpur | <u>Podochorchis gangi</u>
n.sp.
<u>Podochorchis marullai</u> | Intestine
n.subgenus
n.sp.
Intestine
n.sp. |
|-----|----------------------------------|--|--|--|

- | | | | | |
|--------------------|--------------------------------------|---|--|--|
| 16. | <u>Channa punctatus</u>
(Bl.) | Fish market
Kanpur | x | x |
| 17. | <u>Channa striatus</u>
(Bl.) | Fish market
Kanpur | x | x |
| Family : Sisaridae | | | | |
| 18. | <u>Bagarius bagarius</u>
(Ham.) | River Ganga
Kanpur,
River Ganga
Kanpur,
Fish market
Kanpur | <u>Bucephalus kanpurensis</u> n.sp.
<u>Bucephalus vinodi</u> n.sp.
<u>Ophisthorchis pedicellata</u> | Stomach
Stomach
Gall bladder |
| 19. | <u>Eutropiichthys vacha</u> (Ham.) | Fish market
Kanpur | x | x |
| 20. | <u>Heteropneustes fossilis</u> (Bl.) | Fish market
Kanpur | x | x |
| 21. | <u>Mystus tengara</u>
(Ham.) | Fish market
Ghatampur
Fish market
Kanpur | x

x | x

x |
| 22. | <u>Mystus vittatus</u>
(Bl.) | Fish market
Kanpur
Fish market
Kanpur
Fish market
Pokhrayan

Fish market
Kanpur
Fish market
Ghatampur | <u>Podochorchis vittatusi</u> n.sp.
<u>Allocreadium handiai</u>
<u>Pycnadena pokhrayansis</u> n.sp.
<u>Neodicrocoelium nirupmai</u> n.sp.
<u>Neopecoelina fotedarii</u> n.sp.
<u>Neopecoelina chadailai</u> n.sp. | Intestine
Intestine
Intestine
Intestine
Intestine
Intestine |
| 23. | <u>Mystus seenghala</u>
(Sykes) | Fish market
Bhognipur | x | x |

24. <u>Rita rita</u> (Ham.)	Fish market	<u>Allocreadium</u>	Intestine
	Kanpur	<u>nicolla</u>	
	Fish market	<u>Allocreadium</u>	Intestine
	Kanpur	<u>isoporum</u>	
	Fish market	<u>Allocreadium</u>	Intestine
	Kanpur	<u>dukhwai</u>	
	Fish market	<u>Ancylocoelium</u>	Intestine
	Kanpur	<u>ritai</u> n.sp.	
	Fish market	<u>Nicolla</u>	Intestine
	Kanpur	<u>halicoeri</u>	
	Fish market	<u>Nicolla indica</u>	Intestine
	Kanpur		
	Fish market	<u>Nicolla</u>	Intestine
	Kanpur	<u>skorizabini</u>	
	Fish market	<u>Nicolla dayali</u>	Intestine
	Kanpur	n.sp.	

DESCRIPTION OF TREMATODES

FAMILY ALLOCREADIIDAE

(Plate No - 1)

Host : Rita rita (Ham.)
Location : Intestine
Locality : Fish market Kanpur
No of fish examined : 300
No of fish infected : 1
No of specimen collected : 5

Description

Body elongated, smooth with narrow anterior and broad posterior ends. Oral sucker subterminal, spherical or subspherical. Ventral sucker spherical or subspherical pre equatorial, muscular, larger than oral sucker. Pre pharynx present. Pharynx globular muscular. Oesophagus long tubular. Intestinal caeca terminating near posterior end of body. Testes entire, tandem or subspherical ovoid, tandem or obliquely tandem, separated, unequal. Cirrus sac saccular or elongated, anterior to ventral sucker. Vesicula seminalis small. Pars protatica small surrounded by a large number of prostate gland cells. Ejaculatory duct small tubular. Ovary oval, or rounded, posterior to ventral sucker. Receptaculum seminis post ovarian.

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Vitelline follicles small extending from anterior end of body up to posterior end of body. Uterus arises from ootype may extend up to posterior testes then turns anteriorly and opens at genital pore. Egg large, operculated, Genital pore median post bifurcal.

Excretory bladder simple, tubular; excretory pore terminal.

M E A S U R E M E N T

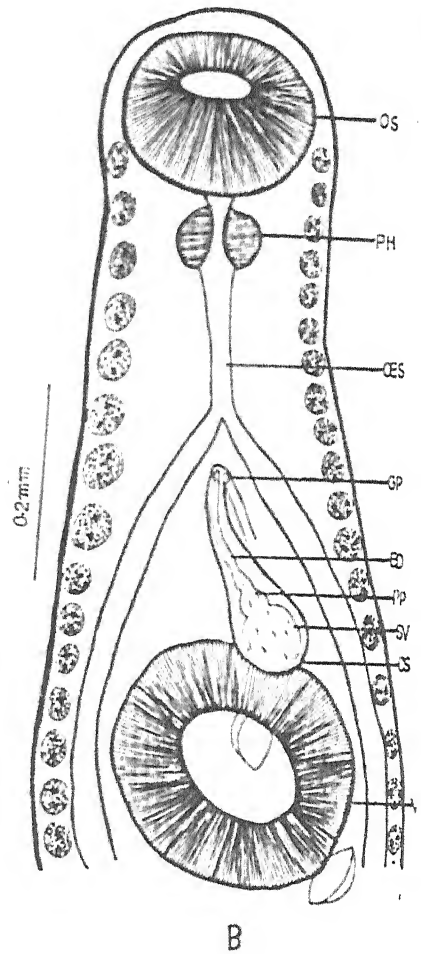
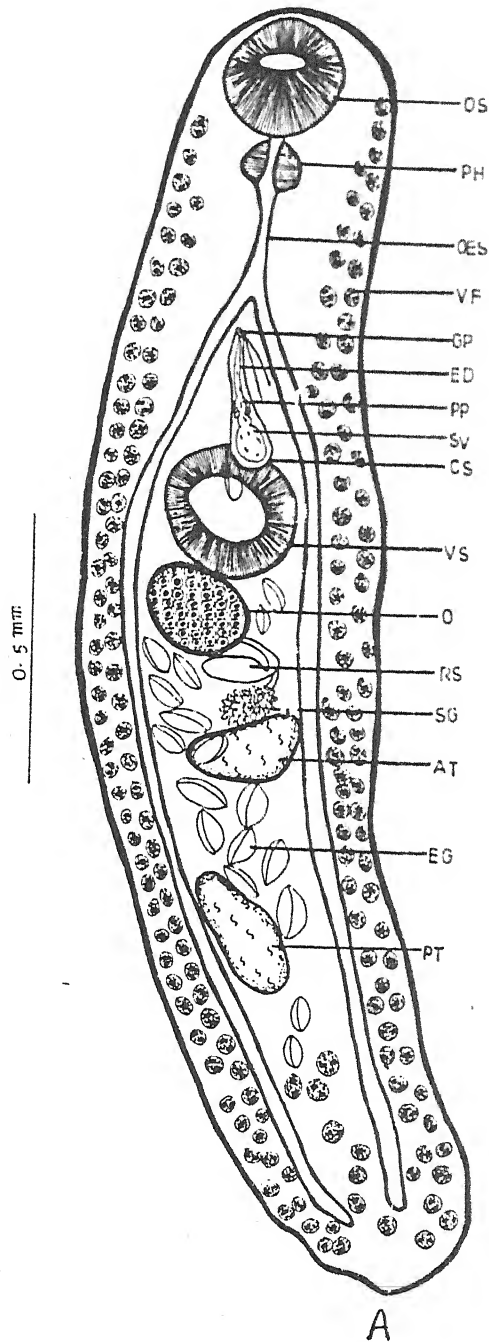
Body length, 2.40; width 0.560; oral sucker, 0.220x0.210
Ventral sucker, 0.250x0.220; prepharynx, 0.01x0.025;
Pharynx, 0.095x0.11; oesophagus, 0.22x0.025;
Anterior testis, 0.215x0.115; posterior testis, 0.250x0.115;
Cirrus sac, 0.260x0.075; Vesicular seminalis, 0.070x0.055;
Pars prostatica 0.45 x 0.020; ejaculatory duct, 0.115x0.045;
Egg, 0.22x0.025.

D I S C U S S I O N

The present form belongs to genus Allocredium loss, 1900. It closely resembles with A. duknwai Agarwal and sharma, 1989, but differs from in having long oesophagus, in the size of oral & ventral sucker and extension of the vitelline follicles.

These characters have been considered as individual variation.

PLATE - 1



Allocreadium dukunwai Agarwal & Sharma 1989

(Plate no 1)

- Fig. A : Entire worm.
- Fig. B : Anterior part of body showing position of
cirrus sac, ovary and caecal bifurcation
enlarged(drawn from live specimen)
- Fig. C : Egg enlarged .

Allocreaolium fasciatusi

Kakaji 1969

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(Plate no - 2)

Host : Tor tor (Ham.)

Location : Intestine

Locality : Fish market Kanpur

No of fish : 70
examined

No of fish infected : 1

No of specimen : 4
collected

Description

Body elongated, smooth, oral sucker subterminal, rounded, or spherical, larger than ventral sucker. Ventral sucker rounded spherical, muscular. Prepharynx absent. Pharynx small muscular, rounded. Oesophagus absent. Intestinal caeca terminating at posterior end of body. Testes entire, subspherical, obliquely tandem, post equatorial, more or less equal. Cirrus sac sac-
-cular anterior to ventral sucker. Vesicula seminalis sac like bipartite, parsprostatica small surrounded by a large number of prostate gland cells. Ejaculatory duct narrow small. Ovary rounded, post equatorial, preterticular. Receptaculum sem-
-inis small, post ovarium, pre terticular. Vitelline follicles

extending from middle of ventral sucker up to hind end of body uterus arises from ootype extending up to ovary than turns anteriorly and opens at the genital pore. Egg few large & small operculated. Genital pore intracoecal between intestinal caeca and ventral sucker.

Excretory bladder simple tubular excretory pore terminal.

Measurements

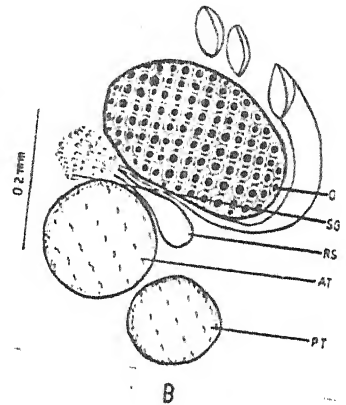
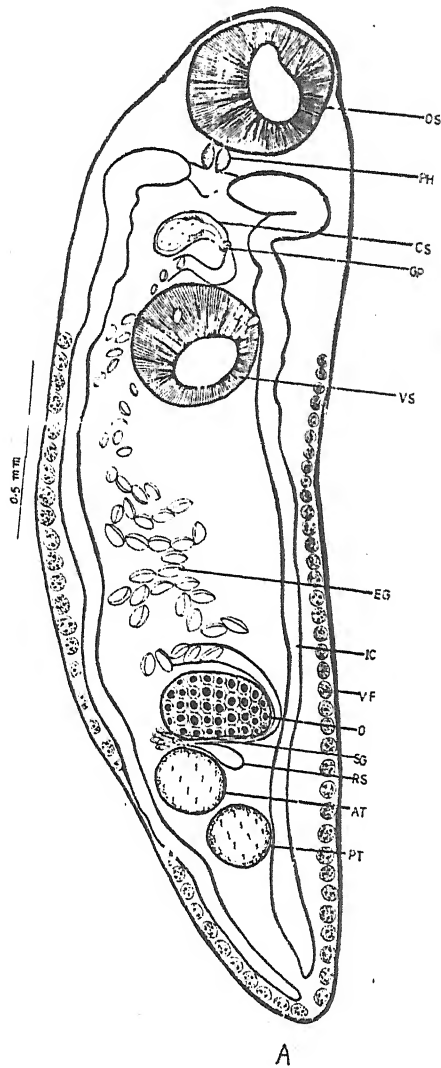
Body length, 2.875, width, p.775, oral sucker, 0.370 x 0.40; ventral sucker, 0.35; pre pharynx absent. pharynx, 0.08 x 0.08 oesophagus absent; Anterior testis, 0.175 x 0.075; Posterior testis, 0.165 x 0.165; cirrus sac, p.24 x 0.095; vesicular seminalis 0.09 x 0.065; pars prostatica, p.045 x 0.40; Ejaculatory duct, 0.080 x 0.020; ovary, 0.30 x 0.185; Receptaculum seminis 0.15 x 0.045; Egg, 0.06 x 0.035

Discussion

The present form belongs to genus Alloereaalium Looss, 1900. It closely resemble with A. fasiatusi Kakaji, 1969, but differs from it in the ratio and size of ventral sucker and oral sucker. In the absence of pre pharynx and oesophagus size and position ovary, in the presence of receptaculum seminis, of uterine coil and the extention of the vitelline follicles.

These characters have been considered as individual variations. It is added as an additional host.

PLATE - 2



Alloereadium fasciatusi

(Plate No 2)

Fig. A : Entire worm

Fig. B : Posterior portion of body showing
Ovary, Receptaculum, shell gland,
and testes, etc. enlarged (drawn
from live specimen)

Fig. C : Eggs - Enlarged

(Plate No 3)

Host : Mystus Vittatus (cuv.&Bloch)

Location : Intestine

Locality : Fish market Kanpur

No of fish examined: 350

No of fish ~~infected~~:1

No of specimen : 3
collected

Description

Body elongated, smooth, with narrow posterior & broad anterior ends. Oral sucker subterminal, rounded, subspherical muscular larger than the ventral sucker. Ventral sucker, rounded or spherical, pre equatorial. Pre pharynx absent. pharynx globular muscular. Oesophagus absent. Intestinal caeca terminating at the hind end of body. Testes entire, spherical, or rounded, unequal, irregular, post equatorial, anterior testis larger than the posterior testis. Cirrus sac saccular elongated, anterior to ventral sucker. Vesicula seminalis large, sac like. Pars prostatica small surrounded

by large number of prostet gland cells. Ejaculatory duct narrow long. Ovary spherical or sub spherical, equatorial, close & post Ventral sucker. Receptaculum seminis small, preovarian. Vitelline follicles extending from hind end of ventral sucker up to posterior end of body. Uterus arises from ootype extending anterior testis then turns anteriorly and opens at genital pore. Eggs large operculated Genital pore at the intertinal bifurcation or hind end of pharynx.

Excretory bladder simple, tubular, excretory pore terminal.

Measurements

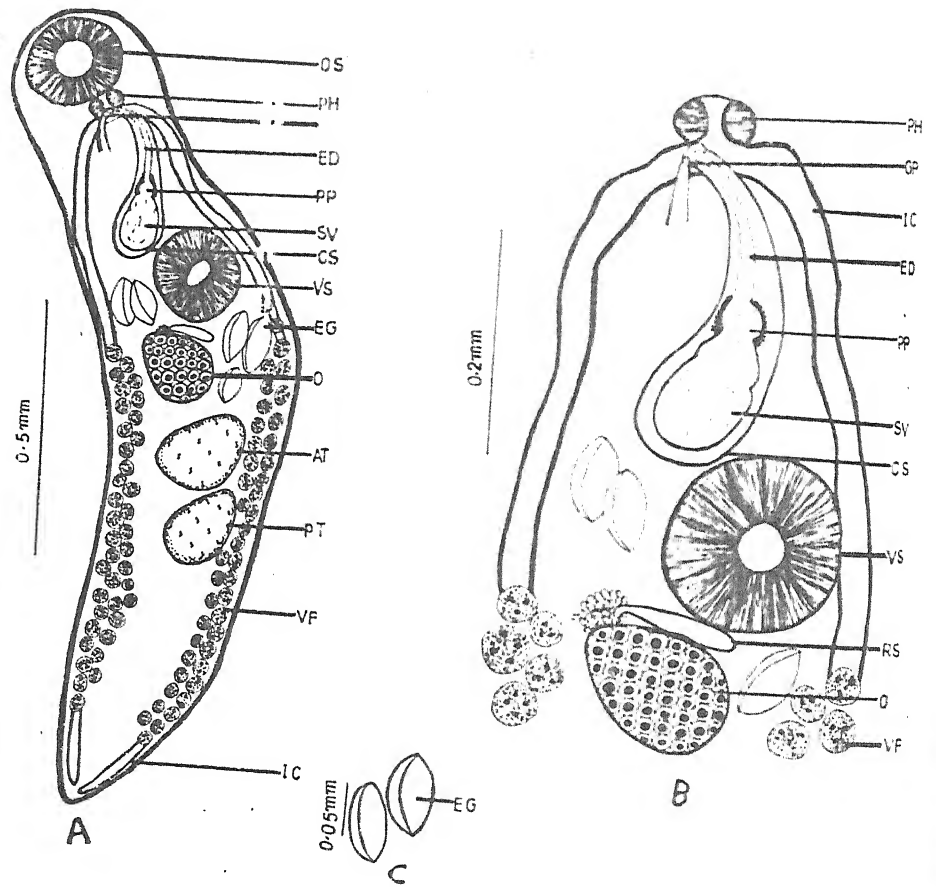
Body length, 1.675; width, 0.385, oral sucker, 0.190x0.175; ventral, 0.180x0.165; Pre pharynx absent; pharynx 0.045x 0.07; oesophagus, absent ; Anterior testis 0.185x0.135; posterior testis 0.175x 0.110; cirrus sac 0.340 x 0.055; Vericula seminalis, 0.110x0.070, pars prostatica, 0.045 x 0.030; ejaculatory duct, 0.170 x 0.015 ; Ovary 0.160x0.125, Receptaculum seminis, 0.08x0.02; egg, 0.095x0.045.

Discussion

The present form belongs to genus Allocredium loss, 1900.

It closely resemble with A handia pande 1937, but differs from it in having posterior testis smaller than anterior testis, Cirrus sac elongated, extending anterior to ventral sucker up to post pharyn geal in which long ejaculatory duct. Ovary post acetabular, equatorial. In the relative size of various organs. These characters have been considered as individual variation. For the first time being reported this host.

PLATE - 3



BIA 17

Allocreadium handiai pande 1937

(Plate No 3)

Fig. A. : Entire worm

Fig. B. : Showing variations

(Based on Paratype)

Fig. C. : Egg enlarged.

42

Allocreadium Kosia Pande 1937

(Plate No - 4)

Host : Tor tor (Ham.)

Location : Intestine

Locality : Fish market Kanpur

No of fish exam- : 70
-ined.

No of fish infec- : 1
-ted .

No of specimen : 5
collected

Description

Body elongated smooth, rounded anterior and tapering posterior ends. Oral sucker subterminal, rounded , or spherical, muscular. Ventral sucker pre equatorial rounded muscular. Prepharynx absent. Pharynx rounded, muscular. Oesophagus thick short or long, tubular. Intestinal caeca terminating posterior end of body. Testes entire, tandem post equatorial, anterior testis larger than posterior testis. Cirrus sac small, sac like vesicula seminalis bipartite, parsprostatica short, surrounded with large number of prostate gland cells. Ejaculatory duct

47
small narrow. Ovary rounded or spherical, just post ventral sucker, pre equatorial. Receptaculum seminis equatorial, postovarian, pre testicular, sac like. Vitelline follicles extending from pharyngeal region up to hind end of body. Confluent in post testicular region. Uterus arises from ootype extending upto middle of anterior testis or post ventral sucker, then turns anteriorly and opens at genital pore. Genital pore up to middle of intestinal bifurcation and ventral sucker. Eggs oval large operculated.

Excretory bladder extending up to posterior testis excretory pore terminal.

Measurements.

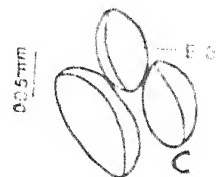
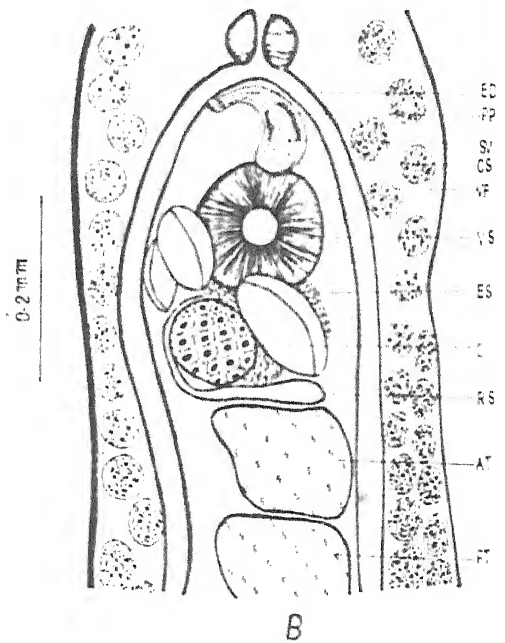
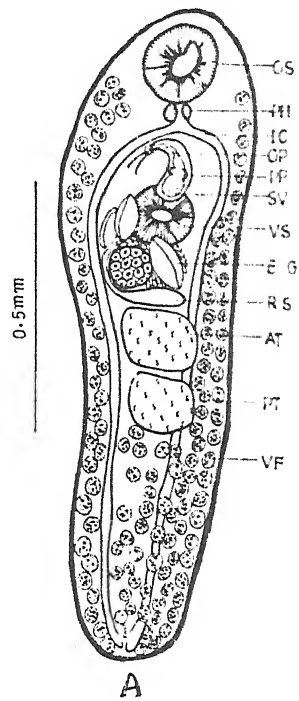
Body length 1.275; width 0.370, oral sucker, 0.155x0.145; ventral sucker, 0.125x0.120; prepharynx absent; pharynx, 0.045x0.060; oesophagus absent Anterior testis, 0.175x0.115; Posterior testis 0.140x0.110; cirrus sac, 0.16 x0.055; vesicula seminalis, 0.040x0.035; pars prostatica, 0.030x0.025; Ejaculatory duct, 0.065x0.005; Ovary, 0.085x0.080, Receptaculum seminis Absent; Egg, 0.095x0.045.

Discussion

The present form belongs to genus Allocreadium loss 1900. It closely resemble with A. Kosia Pandey, 1937. But differs from it in having middle ventral sucker, in the position & shape of receptaculum seminis, position, size & shape of anterior testis, vitelline follicles extend up pharyngeal region to hind end of body.

These characters are considered as individual variation.

PLATE - 4



Allocreadium Kasia Pande 1937

(Plate No 4)

Fig. A. : Entire worm.

Fig. B. : Anterior part of body showing cirrus
sac, position ovary ootype and testes.
(drawn from live specimen)

Fig. C. : Eggs enlarged.

45

Allocredium isoporum Looss 1894

(Plate No. 5)

Host : Rita rita (Ham.)
Location : Intestine
Locality : Fish market Kanpur
No. of fish examined : 300
No. of fish infected : 1
No. of specimen collected : 2

Description

Body elongated, smooth, rounded both ends of body, oral sucker subterminal, rounded or spherical, ventral sucker just pre-equatorial, rounded or spherical, intracaecal, preovarian. prepharynx absent. Pharynx muscular rounded. Oesophagus long tubular. Intestinal caeca terminating near posterior end of body. Testes oval or rounded obliquely tandem, post equatorial, more or less equal, cirrus sac elongated. Anterior to ventral sucker, upto intestinal bifurcation. Vesicula seminalis sac like, elongated, bipartite, pars prostatica small, surrounded with numerous prostate gland cells. Ejaculatory duct narrow tubular.

Ovary oval or spherical, large, just post ventral sucker, equatorial. Receptaculum seminis post-ovarian. Vitelline follicles extending on intestinal bifurcation upto posterior end of body. Uterus arise from ootype extending upto posterior testis, then turns anteriorly and opens at genital pore. Egg large or few small, operculated. Genital pore interaceacal between intestinal ceaca and ventral sucker.

Excretory bladder simple, tubular, excretory pore terminal.

MEASUREMENTS

Body length, 2.845 width, 0.740; oral sucker, 0.295 x 0.255; ventral sucker, 0.280 x 0.270; pre pharynx absent; pharynx; 0.125 x 0.140; oesophagus, 0.235 x 0.02; anterior testis, 0.220 x 0.160; posterior testis, 0.225 x 0.170; cirrus sac, 0.380 x 0.080; vesicula seminalis, 0.135 x 0.060; pars prostatica, 0.055 x 0.150; ejaculatory duct, 0.145 x 0.010; ovary, 0.265 x 0.195; receptaculum seminis, 0.16 x 0.065; egg, 0.090 x 0.045.

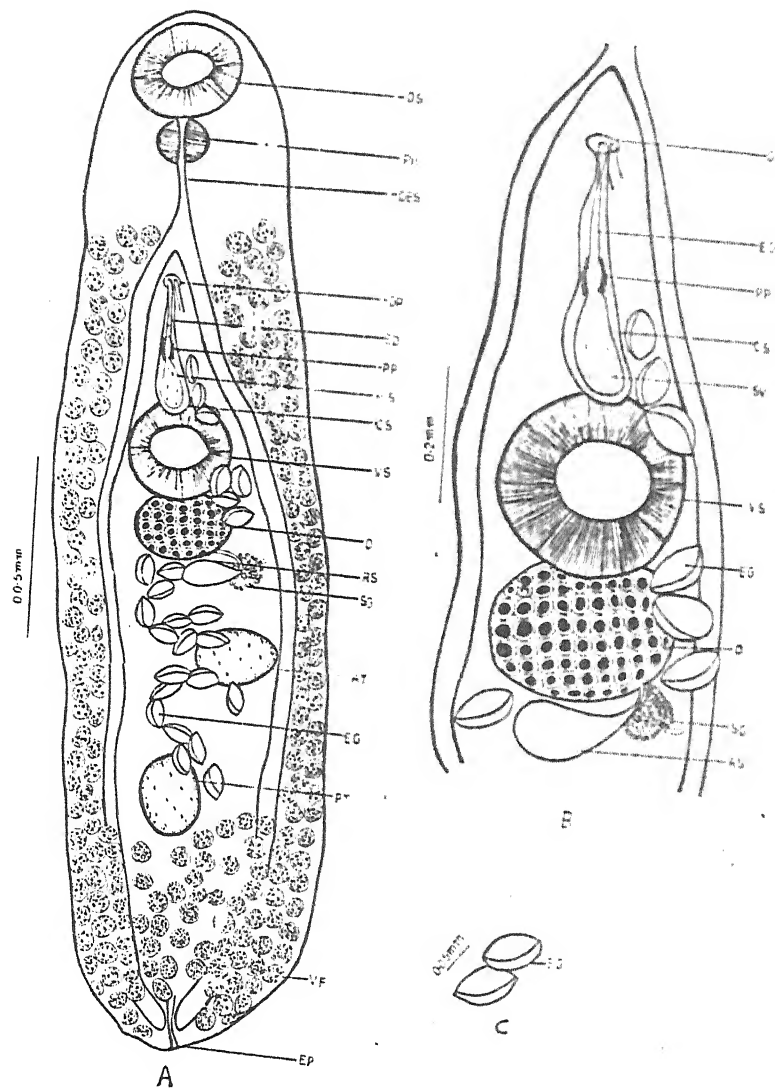
Discussion

The present form is referred to genus Allocreadium Looss, 1900. It closely resembles with A. isoporum Looss, (1894)

Odhner 1901. But differs from it in the presence of oesophagus, in the position of testes, in the size and position of ovary, in the position of receptaculum seminis and in the extension of vetelline follicle.

These characters have been considered as individual variations.

PLATE - 5



Allocredium isoporum Looss 1894

(Plate No. 5)

Fig. A. Entire worm.

Fig. B. Anterior part of body showing position of cirrus
sac, ovary, receptaculum seminis etc. enlarged
(drawn from live specimen).

Fig. C. Egg enlarged.

Allocreadium nicolli Pande, 1937

(Plate No. 6)

Host : Rita rita (Ham.)
Location : Intestine
Locality : Kanpur fish market
No. of fish examined : 300
No. of fish infected : 2
No. of specimen collected : 8

Discreption

Body elongated, smooth with narrow anterior and broad posterior ends. Oral sucker subterminal, spherical, or rounded. Ventral sucker spherical or rounded, smaller than oral sucker, pre-equatorial. Pre-pharynx absent. Pharynx small. oesophagus very short. Intestinal caeca terminating posterior end of body. Testes entire spherical, or oval, just post equatorial, intercaecal, tandem, more or less equal, anterior testis larger than posterior testis. Cirrus sac anterior to ventral sucker, elongated. Vesicula seminalis small, bipartite. Pars prostatica small, surrounded by a large number of prostate gland cells. Ejaculatory duct small, narrow. Ovary oval, pre-equatorial or equatorial, left to

ventral sucker. Receptaculum seminis, pre-ovarian, vitellin follicles extending from posterior level of oral sucker, upto end of body. Uterus arises from ootype, intercaecal, extend upto middle of anterior testis than turns anteriorly and opens at genital pore. Egg oval, large, operculated. Genital pore intracaecal at anterior to ventral sucker or middle of ventral sucker or at the intestinal bifurcation.

Excretory bladder simple tubular; excretory pore terminal.

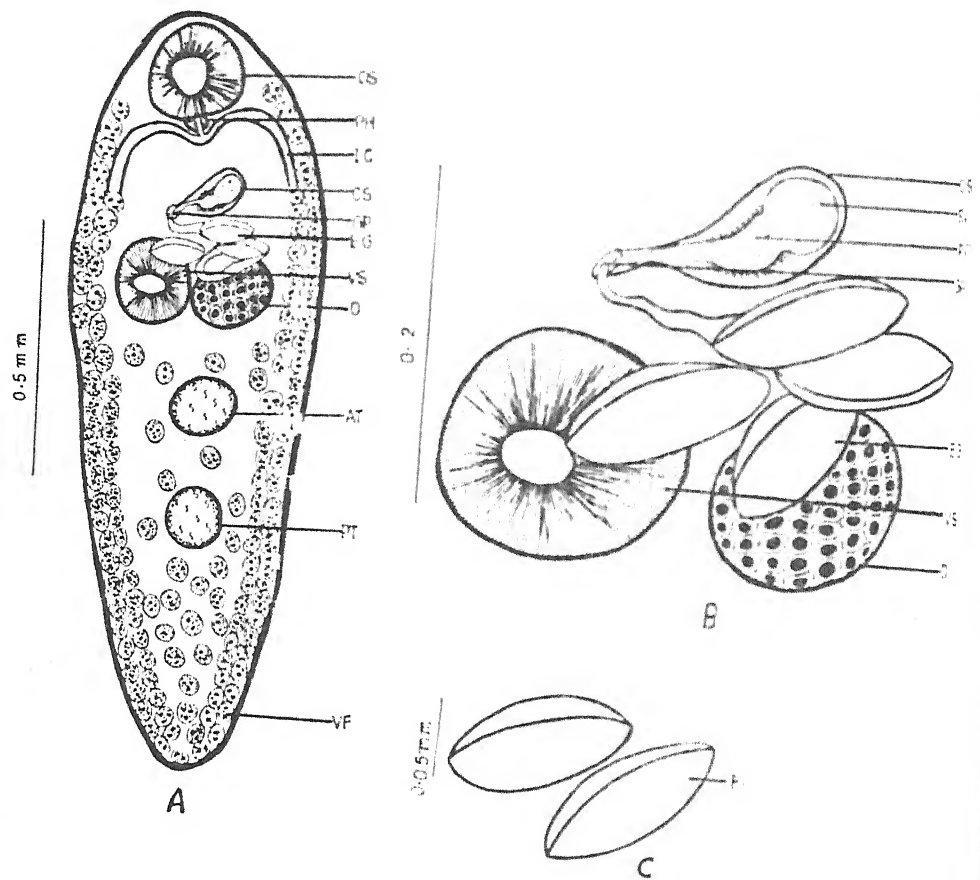
Measurements

Body length, 1.485, width 0.480; oral sucker, 0.195 x 0.105; ventral sucker, 0.175 x 0.15; pre-pharynx absent; pharynx, 0.045 x 0.045; oesophagus 0.01 x 0.01; anterior testis, 0.135 x 0.115; posterior testis, 0.120 x 0.110; cirrus sac 0.170 x 0.07; vesicula seminalis, 0.06 x 0.045; pars prostatica, 0.045 x 0.025; ejaculatory duct, 0.055 x 0.010; ovary, 0.165 x 0.125; receptaculum seminis absent; egg 0.115 x 0.055.

Discussion

The present form is referred to genus Allocreadium Looss, 1900. It closely resembles with A. nicolli Pande, 1937 but differs from absence of pre-pharynx, size of oesophagus, in the position of cirrus sac in the opening of genital pore, in the position of ovary and in the relative size of various organs. These characters have been considered as individual variations.

PLATE - 6



Allocreadium nicolli Pande 1937

(Plate No. 6)

Fig. A. Entire worm.

Fig. B. A part of body showing cirrus sac, ovary, ventral sucker and eggs etc. enlarged (drawn from live specimen).

Fig. C. Egg enlarged.

34

Allocreadium thaprai Gupta 1950

(Plate No. 7)

Host	:	<u>Barbus sophor</u> (Ham. & Day.)
Location	:	Intestine
Locality	:	Fish market Kanpur
No. of fish examined	:	200
No. of fish infected	:	7
No. of specimen collected	:	30

Description

Body elongated, smooth, bluntely rounded anterior and slightly tapering posterior ends. Oral sucker subterminal, spherical or rounded. Ventral sucker spherical or rounded, pre-equatorial, muscular, smaller than the oral sucker. Pre-pharynx absent. Pharynx globular muscular. Oesophagus short tubular. Intestinal caeca reaching upto the posterior end of body. Testes post equatorial, tandem, spherical or rounded, interacaecal overlapping or separated, unequal, anterior testis smaller than the posterior testis. Cirrus sac saccular or slightly elongated, small, anterior to ventral sucker, vesicula seminalis small. Pars prostatica small surrounded by a large number of prostate gland cells. Ejaculatory duct.

small. Ovary equatorial, pretesticular, post acetabular, rounded or oval or spherical. Receptaculum seminis, pouch like situated posterior to ovary. Well developed Laurer's canal, opens at ootype, near the receptaculum seminalis. Large number of shell gland surrounded the ootype. Uterus arises from ootype, extend upto posterior testis than turns anteriorly and opens at genital pore. Vitelline follicle large extending from posterior side of ovary upto posterior end of body. Two vitelline duct unite to form a vitelline reservoir. Open at ootype through a vitelline duct. Excretory bladder long tubular extending behind posterior end of body.

Measurement

Body length, 2.940, width, 0.660, oral sucker, 0.255 x 0.255; ventral sucker, 0.210 x 0.200; pre-pharynx absent; pharynx, 0.11 x 0.13; oesophagus absent; anterior testis, 0.290 x 0.255; posterior testis, 0.330 x 0.320; cirrus sac, 0.260 x 0.075; vesicula seminalis 0.075 x 0.055; pars prostatica, 0.045 x 0.030; ejaculatory duct, 0.120 x 0.010; ovary, 0.175 x 0.165; receptaculum seminis, 0.22 x 0.085; egg 0.110 x 0.060.

Discussion

The present form belongs to genus Allocreadium Looss, 1900. It closely resembles with A. thaprai Gupta, 1950 but differs from it in the position and opening of genital pore, in the position, size and shape of receptaculum seminis, in the extension of uterus, and in the relative size of various organs. These characters have been considered as individual variations. It is added as an additional host.

PLATE - 7

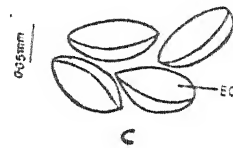
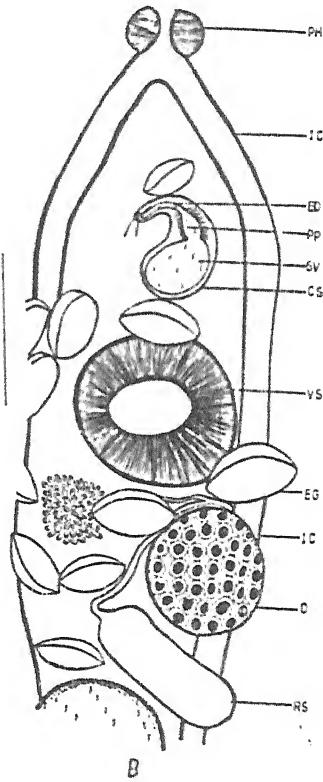
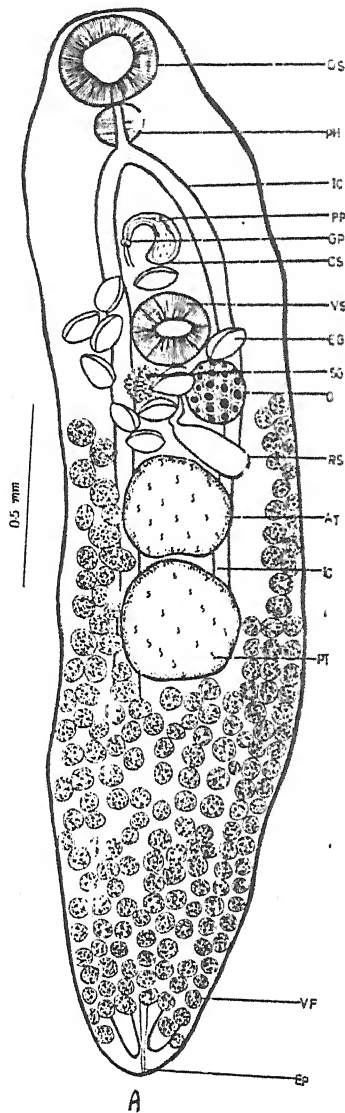


Fig. A.

Fig. B.

Fig. C.

L.A. 19

Allocreadium thaprai Gupta 1950

(Plate No. 7)

Fig. A. Entire worm.

Fig. B. Posterior portion of body showing cirrus sac,
position of receptaculum seminis and ovary etc.
enlarged (drawn from live specimen).

Fig. C. Egg enlarged.

FAMILY : APOCREADIIDAE

9

Apocreadium maxicanum Manter, 1937

(Plate No. 8)

Host	:	<u>Barbus sarana</u> (Ham. & Buch.)
Location	:	Intestine
Locality	:	Fish market Kanpur
No. of fish examined	:	350
No. of fish infected	:	1
No. of specimen collected	:	2

Description

Body elongated, smooth, tapering posterior and anterior ends. Oral sucker subterminal, subspherical. Ventral sucker oval, pre-equatorial, muscular. Prepharynx present. Pharynx rounded muscular. Oesophagus long tubular. Intestinal caeca reaching upto hind end of body. Testes tandem, post-equatorial, anterior testis smaller than posterior testis. Cirrus sac small, sac like. Vesicula seminalis claviform. Pars prostatica short, surrounded with numerous prostate gland cells. Uterus extends up to posterior half of body and turns anteriorly, open through a metraterm at genital pore. Ovary equatorial. Posterior to the ventral sucker. Shell gland numerous surrounded the ootype, Laurer's canal present. Egg oval yellow operculated. Genital pore median and anterior to

ventral sucker. Vitelline follicles extend upto equatorial region to the posterior end of body. Two vitelline duct unite with each other to form a reservoir which opens at ootype. Excretory bladder S shaped, excretory pore terminal.

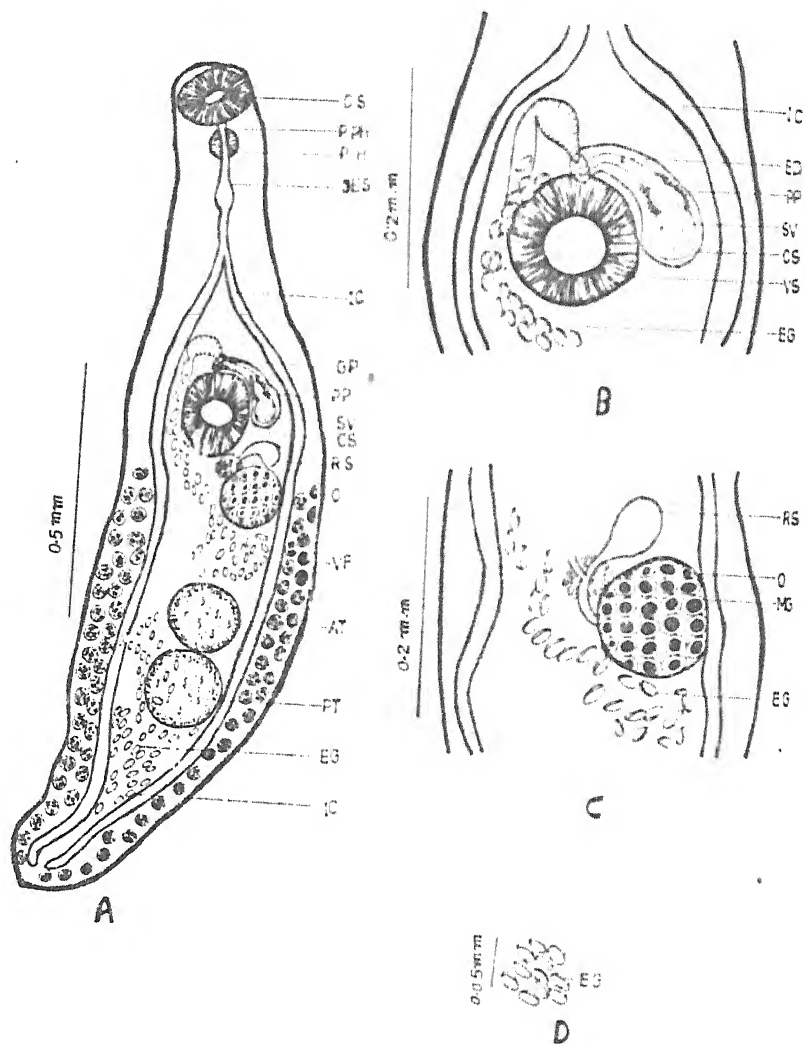
Measurements

Body length, 1.735, width, 0.410; oral sucker, 0.145 x 0.100; ventral sucker, 0.165 x 0.125; pre-pharynx, 0.010 x 0.015; pharynx, 0.05 x 0.06; oesophagus, 0.185 x 0.020; anterior testis, 0.125 x 0.135; posterior testis, 0.145 x 0.145; cirrus sac, 0.185 x 0.040; vesicula seminalis, 0.045 x 0.040; pars prostatica, 0.045 x 0.020; ejaculatory duct 0.075 x 0.010, ovary, 0.125 x 0.115, receptaculum seminis 0.085 x 0.045; egg, 0.025 x 0.010.

Discussion

The present form belongs to genus Apocreadium Manter, 1937. It closely resemble with A. maxicanum Manter, 1937. But differs from it in having long or short oesophagus, in the position of cirrus sac. In the position and shape of the testes and in the relative size of various organs. These characters are considered as individual variations.

PLATE - 8



477 19

Apocreadium maxicanum Manter, 1937

(Plate No. 8)

Fig. A. Entire worm.

Fig. B. Anterior part of body showing relative position of cirrus sac and ventral sucker etc. enlarged (drawn from live specimen).

Fig. C. Mid part of body showing position and shape of ovary and receptaculum seminis etc. enlarged (drawn from live specimen).

Fig. D. Eggs enlarged.

22

FAMILY : BUCEPHALIDAE

53

Bucephalus kanpurensis n.sp.*

(Plate No. 9)

Host : Bagarius bagarius (Ham. & Skyes)
Location : Stomach
Locality : River Ganga Kanpur
No. of fish examined : 500
No. of fish infected : 2
No. of specimen collected : 7

Description

Body elongated, spinose. Oral sucker subterminal, oval, small with crown of eight tentacles. Ventral sucker absent. Pre-pharynx absent. Pharynx oval or rounded. Oesophagus long tubular. Intestine situated post testicularly, post-equatorial, elongated oval. Testes elongated oval, tandem or oblique tandem, more or less equal, and post-equatorial. Cirrus sac small, elongated, extended from hind region of body to pharynx. Vesicula seminalis oval, elongated. Short pars prostatica, surrounded with prostate gland cells and narrow

* A full length paper on this genus and species has been communicated for publication in the "Journal of Scientific Research", Banaras Hindu University, Banaras.

ejaculatory duct. Ovary rounded, intertesticular, just post-equatorial. Receptaculum seminis absent, uterus extend up to two third of body length, leaving anterior one third of body and coils to open at genital pore through a short materaterm. Egg small oval, black, non operculated. Genital pore sub median, vitelline follicles pre-equatorial to equatorial, 6 to 8 in numbers. Excretory bladder tubular and extends up to uterus. Excretory pore sub-terminal.

Measurements

Body length 2.470, width 0.265; oral sucker 0.110 x 0.085; ventralsucker and pre-pharynx absent, pharynx 0.050 x 0.050; oesophagus 0.20 x 0.02; anterior testes 0.225 x 0.105; posterior testis 0.215 x 0.085; cirrus sac 0.370 x 0.075; vesicula seminalis 0.095 x 0.055; pars prostatica 0.115 x 0.035; ejaculatory duct 0.110 x 0.010; ovary 0.090 x 0.080; receptaculum seminis absent; egg 0.010 x 0.005.

Discussion

So far 18 species of the genus Bucephalus Baer, 1926 are reported from India viz., B. aoria Verma, 1936 from Aoria aoria; B. jagannathai Verma, 1936 from Cyrobium guttatum; B. tridentaculata Verma, 1936 from Aoria aoria and Mystus

seenghala; B. barina Srivastava, 1938 from Scatophagus argus;
B. gangeticus Srivastva, 1938 from Pseudotropius athenoides
and Mystus seenghala; B. indicus Srivastva, 1938 from Mystus
seenghala; B. allahabadensis Srivastva, 1963 from Bagarius
bagarius; B. bagarius Srivastva, 1963 from Bagarius
bagarius; B. tridentacularis Srivastava, 1963 from Bagarius
bagarius; B. octotentacularis Kakaji, 1969 from Wallagonia
attu; B. elacatus Yadav, 1977 from Elacate nigra, B. bharatica
and B. purshottami Kumar, 1979 from Bagarius bagarius and B.
indica Agrawaland Agrawal, 1980 from Bagarius bagarius out of
these, B. indicus has been considered synonym of B.
tridentacularia by Srivastva (1963) but Kakaji (1969) retained
B. indicus as a distinct species on the basis of the number of
tentacles, anterior extent of cirrus sac, in the structure of
rhynchus and in the relative size of various organs, A.K.
Maurya and G.P. Agarwal (1992) Bucephalus gangai, B. vinodi
Agrawaland Sachan earliar described from Bagarius bagarius.
The present form differs from all the known species in the
presence of long tubular oesophagus, shape of intestine except
B. allahabadensis, in the shape and position of testes, in the
position of ovary intertesticular; and in the number of
vitelline follicals.

The present form closely related to the B. gangaticus and B. elacatus in the extension and position of the intestine, in the shape and extension of cirrus sac, it also closer to B. indica, B. elacatus and B. aoria, in the number and shape of tentacles, but it differs from B. vinodi new species in which body is aspinose.

It is therefore, considered as new species and named B. kanpurensis n.sp.

The new species is named after the name of city from which host is collected.

PLATE - 9

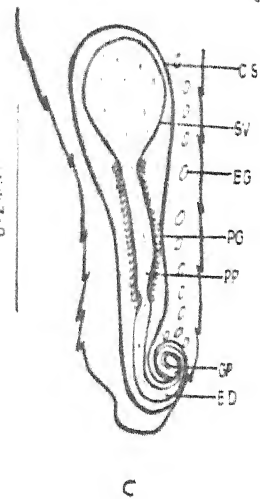
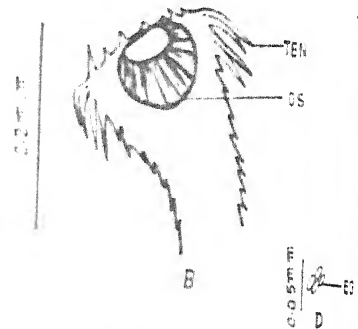
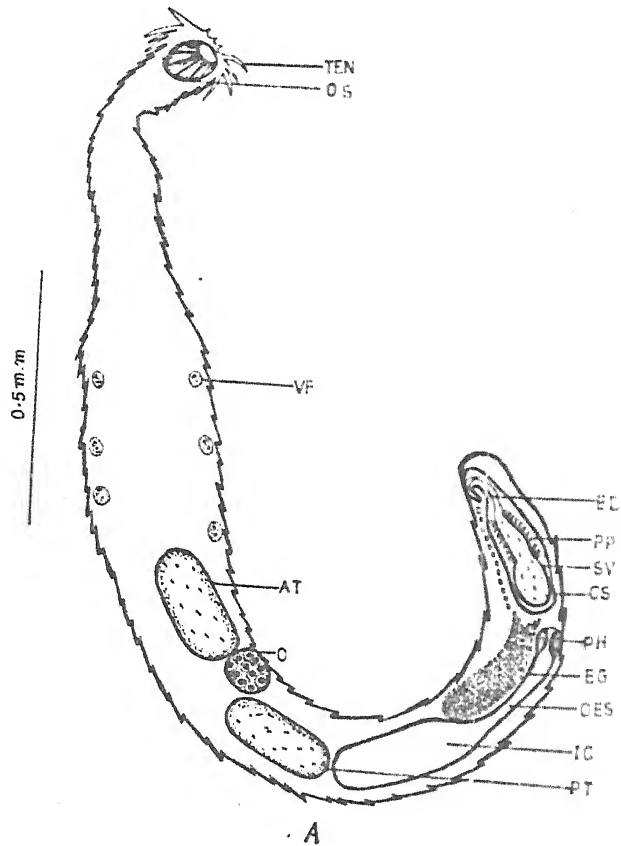


Fig.

Fig.

Fig.

Fig.

H.A. 19

Bucephalus kanpurensis n.sp.*

(Plate No. 9)

- Fig. A. Entire worm.
- Fig. B. Anterior part of body showing oral sucker, tentacles and spines enlarged (drawn from live specimen).
- Fig. C. Posterior part of body showing cirrus sac etc. (drawn from live specimen).
- Fig. D. Egg enlarged.

Bucephalus vinodi n.sp.*

(Plate No. 10)

Host : Bagarius bagarius (Ham. & Skyes.)
Location : Stomach
Locality : Ganga river Kanpur
No. of fish examined : 500
No. of fish infected : 2
No. of specimen collected : 5

Description

Body elongated, spinose. Oralsucker sub-terminal, rounded or oval, with a crown of two tentacles. Tentacles covered by minute spines. Ventral sucker absent. Pharynx oval or rounded, leading in to sac like intestine through a small oesophagus. Intestine post-equatorial. Testes entire, oval tandem, more or less equal and placed one third of body length, reaching anteriorly just posterior to pharynx, parallel to anterior testis encloses vesicula seminalis, elongated, pars prostatica surrounded with prostate gland cells and narrow ejaculatory duct. Ovary oval or rounded, pre-testicular, post-equatorial.

* A full length paper on this genus and species has been communicated for publication in the "Journal of Scientific Research", Banaras Hindu University, Banaras.N

Receptaculum seminis absent. Uterus extend up to anterior region of body, leaving anterior one third of body and coils to open at genital pore through a short metraterm. Egg small, oval yellow, non-operculated. Genital pore submedian. Vitelline follicles pre-equatorial to equatorial, 12 to 14 in number, on each side.

Excretory bladder tubular and extends up to uterus excretory pore subterminal.

Measurements

Body length 1.090, width 0.260; oralsucker 0.125; ventralsucker absent; prepharynx absent; pharynx 0.04 x 0.045; oesophagus absent; anterior testis 0.115 x 0.065; posterior testis 0.120 x 0.060; cirrus sac 0.485 x 0.065; vesicula seminalis 0.070 x 0.045; pars prostatica 0.125 x 0.025; ejaculatory duct 0.160 x 0.030; ovary 0.105 x 0.085; receptaculum seminis absent; egg 0.020 x 0.010.

Discussion

So far 17 species of the genus Bucephalus Bear, 1926 are reported from India viz., B. aoria Verma, 1936 from Aoria aoria; B. jagannathai Verma, 1936 from Cymbium guttatum; B. tridentacularia Verma, 1936 from Aoria aoria and Mystus seenghala; B. barina Srivastva, 1938 from Scatophagus argus;

B. gangaticus Srivastva, 1938 from Pseudotropicus athenoides and Myxus seenghala; B. indicus Srivastava, 1963 from Bagarius bagarius; B. bagarius Srivastva, 1963 from Bagarius bagarius; B. tritentacularis Srivastva, 1963 from Bagarius bagarius; B. octotentacularis Kakaji, 1969 from Wallagonia attu; B. elacatus Yadav, 1977 from Elacate nigra, B. bharatica and B. indica Agrawaland Agrawal, 1980 from Bagarius bagarius Maurya and Agrawal 1992 from Bucephalus gangai out of these, B. indicus has been considered synonym of B. tridentacularia by Srivastava (1963) but Kakaji (1969) retained.

B. indicus as a distinct species on the basis of the number of tentacles, anterior extent of cirrus sac, in the structure of rhynchus and in the relative size of various organs.

The present form differs all the known species in the presence of tentacles shape and number of tentacles, which are bifurcated at the tip, in the extension of vitelline follicles except in B. allahabadensis.

It is closer to B. allahabadensis, B. bagarius, B. tritentacularia, B. elacatus, but differs in the position of cirrus sac and in the position of testes.

It further differs from B. chillenc, B. allahabadensis,

in the shape of the intestine. It also differs from B. indicus, in the shape of the egg and from B. barina, B. bharatica in the shape and position of cirrus sac.

Therefore, a new species Bucephalus vinodi n.sp. is erected for its reception.

The new species is named in the honour of prominent helminthologist Dr. Smt. V. Gupta, Professor of Zoology, Lucknow University, Lucknow.

PLATE - 10

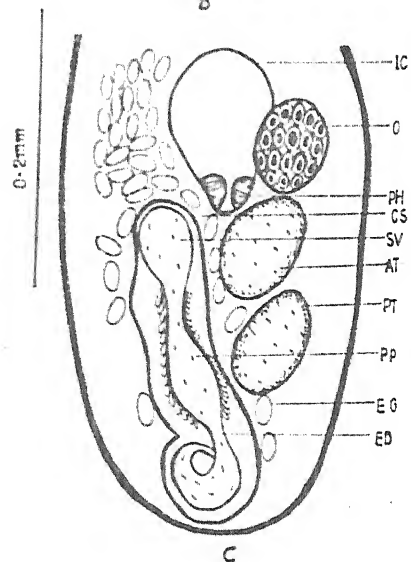
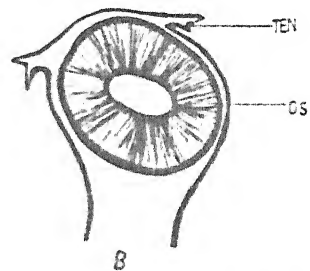
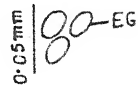
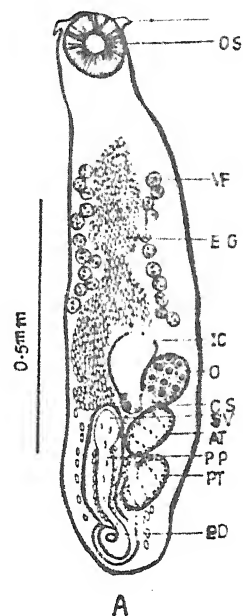


Fig. A.

Fig. B.

Fig. C.

Fig. D.

Bucephalus vinodi*

(Plate No. 10)

- Fig. A. Entire worm.
- Fig. B. Anterior part of body showing 2 tentacle.
- Fig. C. Posterior part of body showing cirrus sac, ovary, testis and other parts of body etc. enlarged (drawn from live specimen).
- Fig. D. Egg enlarged.

Prosorhynchoides garvai Verma, 1936

(Plate No. 11)

Host	:	<u>Barbus sophor</u> (Ham. & Day.)
Location	:	Intestine
Locality	:	Fish market Kanpur
No. of fish examined	:	200
No. of fish infected	:	5
No. of specimen collected	:	35

Description

Body fusiform sub cylindrical, spinose or smooth, rounded anterior and tapering posterior ends. Oral sucker subterminal oval, rhyncus with out tentacular appendages, muscular, mouth placed mid ventrally. Ventral sucker absent. Pharynx muscular, rounded. Oesophagus long tubular or short, narrow. Intestine sac like, elongated; median, equatorial. Testes tandem, symmetrical, left testis elongated, larger than right testis. Cirrus sac straight or curved or sickle shaped, extend up to the oesophagial region to hind end of body, encloses a rounded or oval vesicula seminalis. Elongated, pars prostatica, surrounded with prostate gland cells and long curved ejaculatory duct. Ovary rounded, pretesticular, pre-

equatorial. Receptaculum seminis oval or sac like, post-testicular. Uterus arises from ootype extends anteriorly upto posterior margin of oral sucker and comes down in between the two testes, thus forming a loop on one side and travels to other side, to form a convoluted loop and finally travels to posterior part of body, open in to genital pore. Eggs small oval, yellow. Genital pore posteriorly placed. Vitelline follicles anteriorly placed, in between oral sucker and ovary. Two vitelline duct unite, to form a yolk reservoir and opens at ootype by a common vitelline duct. Excretory vesicle variable in length, elongated sac like extend up to posterior testis.

Measurements

Body length 0.745, width 0.425, oral sucker 0.185 x 0.125; ventral sucker absent. Pre-pharynx absent; pharynx 0.06 x 0.08; oesophagus 0.06 x 0.035; anterior testis 0.135 x 0.120; posterior testis 0.185 x 0.085; cirrus sac, 0.430 x 0.080; vesicula seminalis 0.065 x 0.040; Pars Prostatica, 0.145 x 0.020; ejaculatory duct 0.220 x 0.020; ovary, 0.095 x 0.090; receptaculum seminis, 0.085 x 0.04; egg 0.020 x 0.010.

Discussion

The name Bucephaloides has been treated as a synonym of Prosorhynchoides by Srivastva and Chauhan (1972). The species included under the Bucephloides have been transferred under the genus Prosorhynchoides Dollfus, 1929 with P. ovatus, genotype. Prosorhynchoides garuai (Verma, 1936) differs from the original account of Verma (1936), in the position of various organs. The specimen obtained slightly differs from P. garuai, in the presence of spines half region of body. Testes tandem symmetrical, digonal, unequal, situated left and right side, long tubular oesophagus, in the position of ovary. Receptaculum seminis sac like, small, Laurer's canal present. These features appears to be individual variation.

PLATE - 11

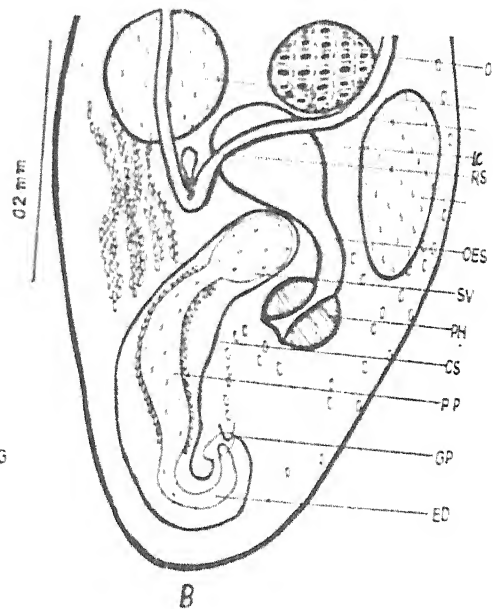
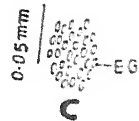
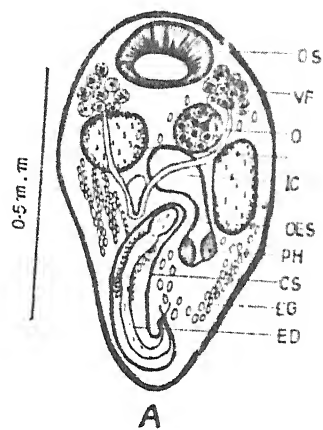


Fig. A.

Fig. B.

Fig. C.

Prosorhynchoides garvai Verma, 1936

(Plate NO. 11)

Fig. A. Entire worm.

Fig. B. Part of body showing variations and position of cirrus sac, vitelline follicles and etc. enlarged (drawn from live specimen).

Fig. C. Egg enlarged.

Prosorhynchoides karvei Bholerao, 1937

(Plate No. 12)

Host : Barbus sophor (Ham. & Day.)
Location : Intestine
Locality : Fish market Kanpur
No. of fish examined : 200
No. of fish infected : 3
No. of specimen collected : 8

Description

Body spinose, sub cylindrical, rounded anterior and tapering posterior ends. Oral sucker subterminal oval or spherical. Ventral sucker absent. Prepharynx absent. Pharynx globular, muscular. Oesophagus absent. Intestine saccular. Testes entire, tandem or obliquely tandem, oval or spherical, unequal, anterior testis equatorial, elongated, posterior testis spherical, smaller than the anterior testis, post equatorial. Cirrus sac long extend upto middle of stomach. Vesicula seminalis small, oval, pars prostatica long, tubular, surrounded by a large number of prostate gland cells. Ejaculatory duct small. Ovary oval or rounded, pre-equatorial. Receptaculum seminis small posterior to the ovary. Uterus

arises from ootype, and opens at genital pore. Eggs small, numerous, non-operculated. Genital pore subterminal at the posterior end of body. Vitelline follicle pre-equatorial, extending between oral sucker and the anterior end of ovary. Number of vitelline follicles 12 to 16 on each side of body. Vitelline duct arises from both side, united near receptaculum seminis and opens in it.

Measurement

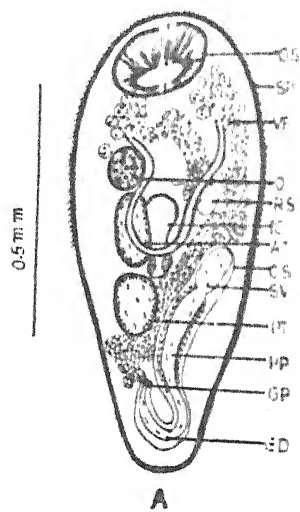
Body length, 0.89, width, 0.365; oral sucker, 0.195 x 0.125, ventral sucker absent, pre-pharynx absent, pharynx, 0.05 x 0.045, oesophagus absent; anterior testis 0.145 x 0.065; posterior testis, 0.120 x 0.085, cirrus sac, 0.545 x 0.065, vesicula seminalis, 0.095 x 0.045; pars prostatica, 0.195 x 0.035; ejaculatory duct, 0.225 x 0.02, ovary 0.085 x 0.070; receptaculum seminis 0.05 x 0.03; egg 0.015 x 0.010.

Discussion

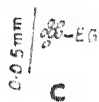
The name Bucephaloides has been treated as synonym of Prosorehenchoides by Srivastava and Chauhan (1972) and the species included under Bucephaloides have been transferred under the genus Prosorehenchoides dollfus, 1929 with P. ovatum

genotype.

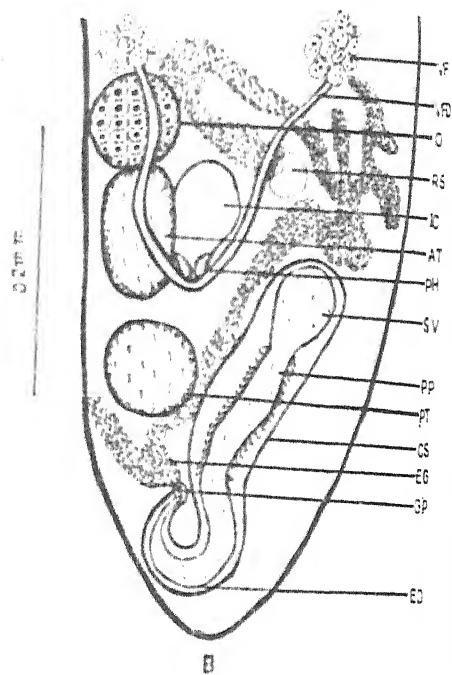
This is the first record of Prosorhynchoides karvei Bholerao, 1937 from Kanpur region. The specimen obtained slightly differs from P. karvei. In the presence of spines, in the body, upto cirrus sac region, in the absence of oesophagus, in the shape of seminal vesicle, shape and size of anterior testis, these features appears to be individual variations.



A



C



B

Fig.

Fig.

Fig.

HIAJ

Prosorhynchoides karvai Bholerao, 1937

(Plate No. 12)

Fig. A. Entire worm.

Fig. B. A part of body showing cirrus sac, vitelline follicles and testes etc. (drawn from live specimen)

Fig. C. Egg enlarged.

FAMILY : DICROCOELIIDAE

82

Neodicrocoelium nirupmai n.sp.*

(Plate No. 13)

Host	:	<u>Mystus vitattus</u> (Cuv. & Bloch.)
Location	:	Intestine
Locality	:	Fish market Kanpur
No. of fish examined	:	350
No. of fish infected	:	1
No. of specimen collected	:	8

Description

Body elongated, spinose, rounded anterior and slightly tapering posterior end. Oral sucker subterminal, oval or rounded. Ventral sucker equatorial, spherical or rounded. Prepharynx small, pharynx muscular, rounded. Oesophagus long tubular. Intestinal caeca reaching up to the posterior end of body. Testes just post equatorial, parallel, small, unequal oval, left testis larger than right testis. Cirrus sac small, sac like, between the ventral sucker and intestinal bifurcation. Vesicula seminalis small, anterior to ventral sucker. Pars-prostatica small surrounded by numerous prostate

* A full length paper on this species has been accepted for publication in the journal "Indian Journal of Helminthology".

gland cells, ejaculatory duct short narrow. Genital pore just post bifurcal, between ventral sucker and intestinal bifurcation. Ovary median, spherical, rounded or oval, post testicular, just post-equatorial. Receptaculum seminis, pre-ovarian small, sac like. Shell gland numerous surrounded the ootype, Laurer's canal not visible. Vitelline follicles small extending from anterior end of body up to posterior end of body, intra and extra coecal, slightly thinner at intracoecal, equatorial region. Uterus arising from ootype up to genital pore, occupying whole of body. Eggs small numerous unembryonated. Excretory bladder simple tubular reaching up to ovary, excretory pore terminal.

Measurements

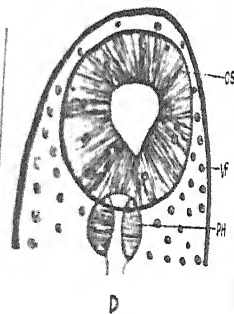
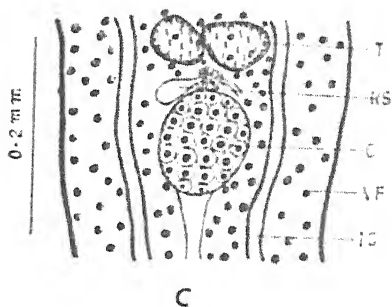
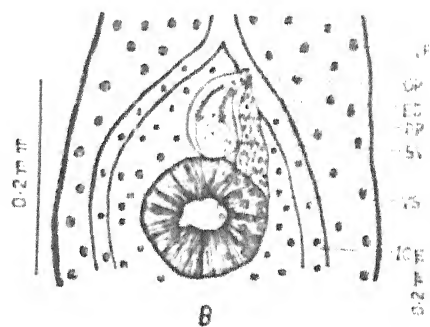
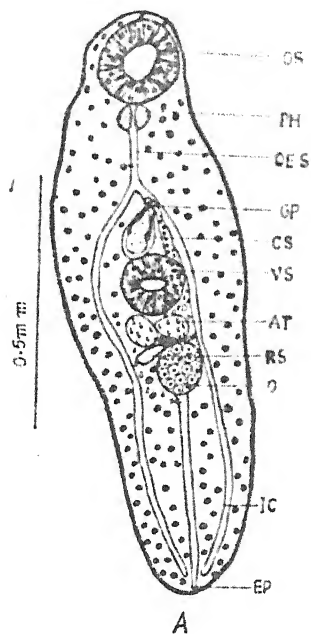
Body length 1.145, width 0.355; oral sucker 0.175 x 0.150; ventral sucker 0.120 x 0.120; pre-pharynx absent; pharynx 0.05 x 0.06; oesophagus, 0.09 x 0.015; anterior testis 0.065 x 0.050; posterior testis 0.060 x 0.045; cirrus sac 0.120 x 0.060; vesicula seminalis, 0.035 x 0.040; pars prostatica, 0.050 x 0.025; ejaculatory duct, 0.025 x 0.005; ovary 0.110 x 0.085; receptaculum seminis, 0.06 x 0.025; eggs 0.010 x 0.005.

Discussion

The present form belongs to genus Neodicrocoelium Agrawal and Sharma, 1989 and it differs from the known species N. gayaprsadai, in the presences of spines on the oral sucker, in the presence of pre-pharynx, by having long tubular oesophagus. Testes are parallel and pairing to each other and vitelline follicles extending from anterior to posterior ends. It is therefore, regarded as a new species.

The new species is named N. nirupmai in the honour of great helminthologist Dr. Nirupma Agrawal, Senior Reader in the Department of Zoology, Lucknow University, Lucknow.

PLATE - 13



Fig

Fig

Fig

Fig

Fig

Neodicrocoelium nirupmai n.sp.*

(Plate No. 13)

Fig. A. Entire worm.

Fig. B. Anterior part of body showing cirrus sac
(drawn from live specimen).

Fig. C. Mid part of body showing ovary testis, Receptaculum
seminis, etc. enlarged (drawn from live specimen).

Fig. D. Anterior part of body showing oral sucker and
extention of vitelline follicles (drawn from live
specimen).

Fig. E. Egg enlarged.

FAMILY : HEMIURIDAE

Macradenina mestacembeli n.sp.*

(Plate No. 14)

Host : Mestacembelus armatus (Lac.)
 Location : Stomach
 Locality : Fish market Kanpur
 No. of fish examined : 500
 No. of fish infected : 3
 No. of specimen collected : 10

Description

Body elongated, smooth, rounded both ends of body. Oral sucker rounded or spherical, terminal or sub terminal. Ventral sucker rounded or spherical, pre-equatorial to equatorial larger than the oral sucker. Pre-pharynx present. Pharynx oval, or rounded, muscular. Oesophagus absent. Intestinal caeca extending to posterior extremity. Testes smaller parallel or tandem, just post equatorial. Cirrus sac median, situated in between intestinal bifurcation and ventral sucker. Vesicula seminalis tubular winding pars prostatica. Ejaculatory duct long tubular. Genital pore about mid way

* A full length paper on this species has been communicated for publication in the journal "Indian Journal of Helminthology."

P P

between two suckers. Ovary entire just post equatorial. Just posterior to ventral sucker intertesticular. Receptaculum seminis large post-ovarian. Vitelline follicles composed, claviform, post ovarian. Uterus extending pre-equatorial and anterior to ventralsucker. Egg small, operculated yellow or black. Excretory vesicles present.

Measurements

Body length 0.915, width 0.240; oral sucker 0.085 x 0.075; ventralsucker 0.195 x 0.190; pre-pharynx 0.02 x 0.01; pharynx 0.045 x 0.045; oesophagus absent; anterior testis 0.040 x 0.035; posterior testis 0.040 x 0.040; cirrus sac 0.155 x 0.045; vesicula seminalis 0.025 x 0.010; pars prostatica 0.040 x 0.015; ejaculatory duct 0.160 x 0.010; ovary 0.065 x 0.060; receptaculum seminis 0.08 x 0.02; egg 0.040 x 0.020.

Discussion

The present form belongs to the genus Macradenina Manter, 1947 with type species M. acanthuri from Accanthurus caeruleus. It differs from it in the presence of pre-pharynx, in the absence of oesophagus, position and size of ventral sucker in the position and size of testes, in the shape and position of ovary and in the extension of uterus. It is

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therefore, regarded as a new species Macrodenina mestacembeli
n.sp.

The new species is name after the name of host from which
the parasite is collected.

PLATE - 14

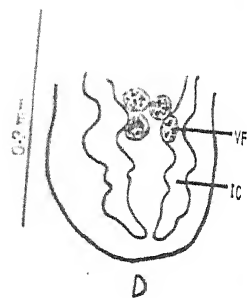
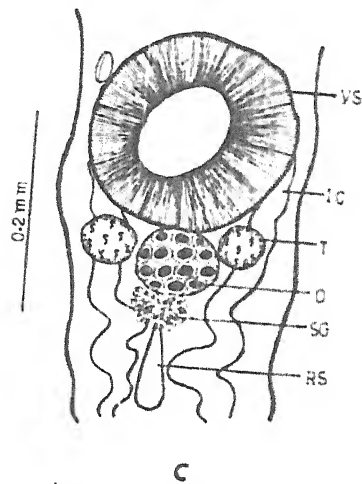
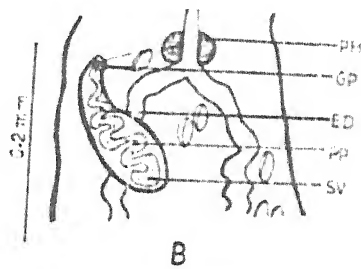
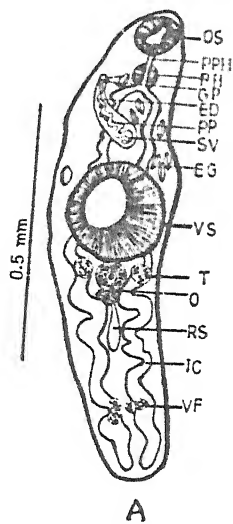


Fig. A

Fig. B

Fig. C

Fig. D

Fig. E

Macradenina mestacembelai n.sp.*

(Plate No. 14)

- Fig. A. Entire worm.
- Fig. B. Anterior part of body showing position of cirrus sac.
- Fig. C. Mid part of body showing Testes, Ovary and Receptaculum seminal etc. enlarged (drawn from live specimen).
- Fig. D. Posterior part of body showing vitelline follicles (drawn from live specimen showing variations).
- Fig. E. Egg enlarged.

Macradenina thapraii n.sp.*

(Plate No. 15)

Host	:	<u>Mestacembelus armatus</u> (Lac.)
Location	:	Stomach
Locality	:	Fish market Kanpur
No. of fish examined	:	500
No. of fish infected	:	3
No. of specimen collected	:	7

Description

Body elongated, smooth, rounded anterior and tapering posterior end. Oralsucker subterminal, rounded, or spherical. Ventral sucker very large extended from pre-equatorial to post-equatorial region of the body, rounded or spherical. larger than the oral sucker. Pre-pharynx absent. Pharynx muscular globular. Oesophagus absent. Intestinal caeca extending to posterior extremity. Testes oval or rounded, post-equatorial, parallel, more or less equal. Cirrus sac pre-ovarian, small, extend upto the intestinal bifurcation. vesicula seminalis sac-like small pars prostatica. Ejaculatory

* A full length paper on this genus and species has been communicated for publication in the "Journal of Scientific Research", Banaras Hindu University, Banaras.

92

duct long tubular. Genital pore just post pharyngeal, at the caecal bifurcation. Ovary oval or rounded. Pre-equatorial, anterior to the ventralsucker. Receptaculum seminis small, sac-like, post-ovarian, anterior to ventralsucker. Vitelline follicles composed claviform, post-testicular at the hind end of body. Uterus arises at the intestinal bifurcation and anterior to ventral sucker. Eggs small, operculated, yellow black. Excretory vesicles present.

Measurements

Body length 1.850, width 0.750; oral sucker 0.30 x 0.240; ventral sucker 0.740 x 0.655; pre-pharynx 0.005 x 0.020; pharynx 0.055 x 0.080; oesophagus absent; anterior testis 0.140 x 0.095; posterior testis 0.105 x 0.100; cirrus sac 0.140 x 0.050; vesicula seminalis 0.035 x 0.030; pars prostatica 0.035 x 0.005; ejaculatory duct 0.125 x 0.010; ovary 0.150 x 0.085; receptaculum seminis 0.085 x 0.030; egg 0.020 x 0.010.

Discussion

The present form belongs to the genus Macradenina Manter, 1947. As far as the writer is aware so far only two species have been described. M. acanthuri Manter, 1947 from Acanthurus

caruleus and M. mestacembeli Agrawal and Sachan, 1993 from Mestacembelus armetus. The present form differs from all the known species, in the absence of pre-pharynx and oesophagus, in the position, shape and size of testes. In the extension and position of cirrus sac, opening of genital pore, in the position and shape of ovary, in the position and size of receptaculum seminis. In the number of vitelline follicles, it is therefore, regarded as a new species M. thapraii n.sp.

The new species is named in the honour of Late Professor Dr. G.S. Thapar. He is great reputed helminthologist of India.

PLATE - 15

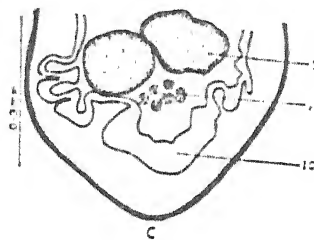
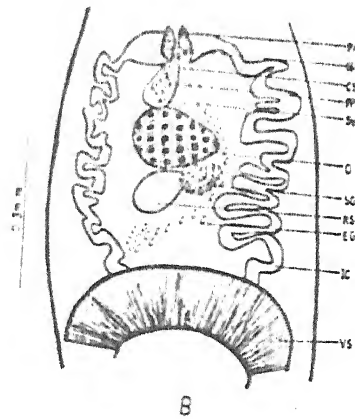
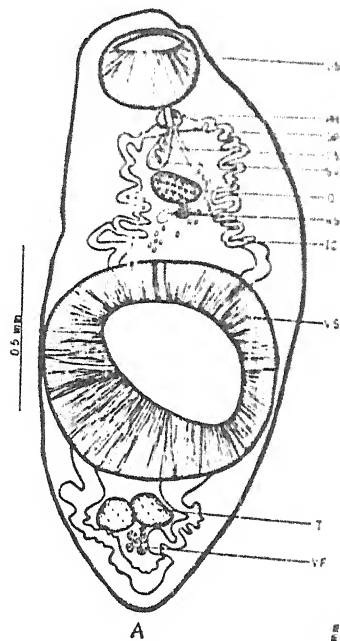


Fig. A.

Fig. B.

Fig. C.

Fig. D.

Macradenina thapraii n.sp.*

(Plate No. 15)

- Fig. A. Entire worm.
- Fig. B. Anterior part of body showing cirrus sac, position of ovary and receptaculum seminis etc. enlarged (drawn from live specimen).
- Fig. C. Posterior part of body showing position of testes, vitelline follicles, etc. enlarged (drawn from live specimen).
- Fig. D. Egg enlarged.

FAMILY : MONARCHIIDAE

95

Ancylocoelium ritai n.sp.*

(Plate No. 16)

Host : Rita rita (Ham.)
Location : Intestine
Locality : Fish market Kanpur
No. of fish examined : 300
No. of fish infected : 2
No. of specimen collected : 15

Description

Body elongated, smooth, tapering anterior and rounded posterior ends. Oral sucker terminal, rounded. Ventralsucker, pre-equatorial, or equatorial, oval or rounded or muscular, post bifurcal, pre-pharynx long tubular, pharynx rounded muscular. Oesophagus thick tubular small. Intestine V shaped with two limbs terminating a little behind level of intestinal bifurcation. Testes tandem oval and rounded post-equatorial, anterior testis larger than the posterior testes, cirrus sac elongated, pouch like, behind right caecum, containing large seminal vesicle and short pars prostatica, surrounded by

* A full length paper on this species has been accepted for publication in the journal "Indian Journal of Helminthology."

numerous prosted gland cells. Genital pore median, post-bifurcal. Ovary just posterior to ventralsucker, rounded or oval, vitelline follicles tubular extend up to equatorial region to hind end of body. Receptaculum seminis post-ovarian, sac like, equatorial. Uterus extremely voluminous, not convoluted, extending posterior end of body to genital pore. Eggs small yellow black, operculated. Excretory vesicles tubular.

Measurements

Body length 2.28, width 0.40; oral sucker 0.185 x 0.155; ventral sucker 0.235 x 0.165; pre-pharynx 0.13 x 0.025; pharynx 0.09 x 0.095; oesophagus absent; anterior testis 0.125 x 0.135; posterior testis 0.140 x 0.085; cirrus sac 0.270 x 0.060; vesicula seminalis 0.095 x 0.060; pars prostatica 0.075 x 0.020; ejaculatory duct 0.110 x 0.010; ovary 0.135 x 0.010; receptaculum seminis 0.11 x 0.06; egg 0.025 x 0.015.

Discussion

The present form belongs to genus Ancylocoelium Nicoll 1912 so far only one species A. typicum is known. The present form differs from it by having smooth body, pre-pharynx long tabular, pharynx prominent muscular. Oesophagus short, thick intestinal caeca, V shaped, extend in pre-equatorial region or

above the ventral sucker. In the position of ovary which is closer to posterior end of ventralsucker in having receptaculum seminis between ovary and anterior testis.

In the view of these differences the present form is considered as a new species with a specific name A. ritai.

The name of species is given after the name of host from which it was collected.

PLATE - 15

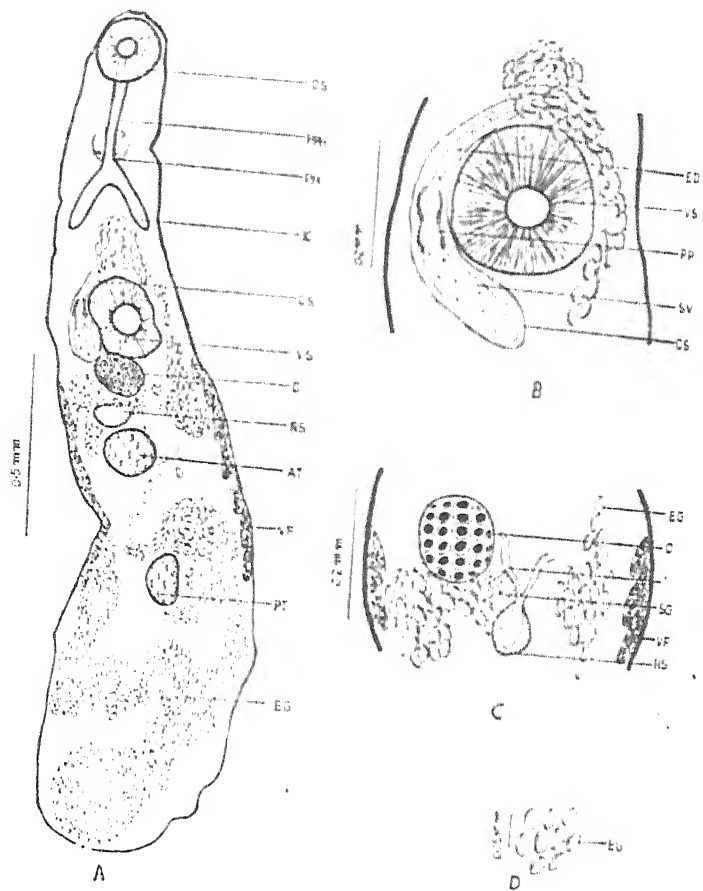


Fig. A

Fig. B

Fig. C

Fig. D

Ancylocoelium ritai n.sp.*

(Plate No. 16)

Fig. A. Entire worm.

Fig. B. Anterior part of body showing cirrus sac etc.
enlarged (drawn from live specimen).

Fig. C. Mid part of body showing position and shape of ovary,
receptaculum seminalis, vitelline follicles.

Fig. D. Egg enlarged.

FAMILY : OPISTHORCHIIDAE

101

Ophisthorchis pedicellata Verma, 1927

(Plate No. 17)

Host : Bagarius bagarius (Ham. & Skyes)
Location : Gall bladder
Locality : Fish market Kanpur
No. of fish examined : 500
No. of fish infected : 10
No. of specimen collected : 32

Description

Body elongated, spinose, slender with narrower anterior and tapering posterior ends. Oral sucker oval or rounded. Ventral sucker equatorial, spherical or rounded and larger than oral sucker. Pre-pharynx very small, visible in living specimen. Pharynx globular oval and muscular. Oesophagus short. Intestinal caeca reaching up to hind end of posterior testis. Testes lobed tandem located in posterior region of the body and more or less equal. Cirrus sac posterior to ventral sucker, post equatorial, vesicula seminalis, thin walled, long tubular extend up to posterior end of ventral sucker and middle region of the body. Ovary pretesticular, pear shaped, oval or rounded. Receptaculum seminis sac like post-ovarian, pre testicular on left side, uterus intercaecal, coils

horizontally placed extending in between ventral sucker and ovary, and opens at genital pore by metraterm. Shell glands numerous and surrounded. The ootype. Laurer's canal present. Egg oval small yellow, black, operculated. Genital pore median, pre-acetabular. Vitelline follicles extend from little posterior to ventral sucker up to middle of ovary. Two vitelline duct unite with each other to form a yolk reservoir, which opens at ootype. Excretory bladder 'S' shaped, excretory pore terminal.

Measurements

Body length 2.325, width 0.220; oral sucker 0.095 x 0.095; ventral sucker 0.185 x 0.150; pre-pharynx 0.02 x 0.01; pharynx 0.045 x 0.05; oesophagus absent; anterior testis 0.275 x 0.080; posterior testis 0.180 x 0.085; cirrus sac 0.555 x 0.020; vesicula seminalis, pars prostatica and ejaculatory duct non vesicle. Ovary 0.090 x 0.070; receptaculum seminis 0.09 x 0.94; egg 0.020 x 0.010.

Discussion

The present form belongs to Opisthorchis pedicellata Verma 1927 and is recorded for the first time from Kanpur region earlier, Verma (1927) described, this species from the

gall bladder of Bagarius bagarius, at Allahabad. Further more this parasite has been also redescribed by Kumar (1979) from Bagarius bagarius at Varanasi, and this parasite also redescribed by Agrawal and Agrawal (1980) from Bagarius bagarius at Bundelkhand Jhansi region. However, it differs from the original account of Verma (1927) in the ratio of suckers, position of oral sucker which is terminal in the presence of prepharynx, oesophagus is very short or absent. Extension of vesicula seminalis from post-equatorial of body up to just above the anterior end of ventral sucker. These differences appears to be individual variation.

PLATE - 17

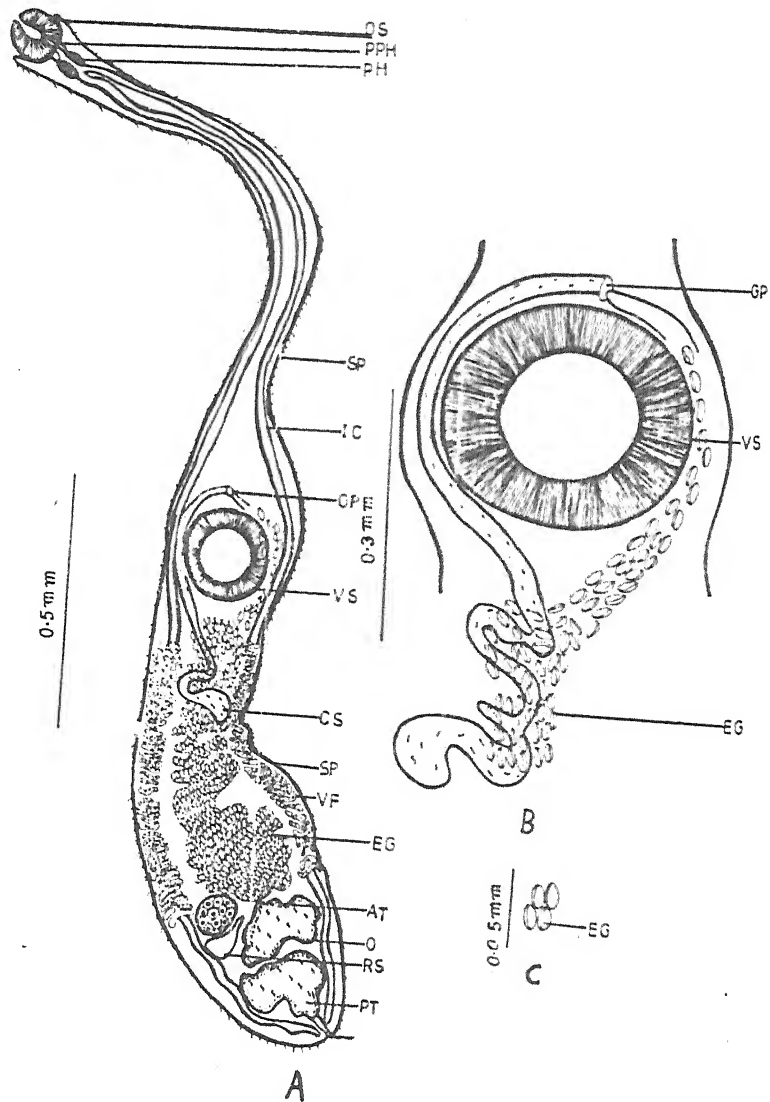


Fig. A.

Fig. B.

Fig. C.

Ophisthorchis pedicellata Verma 1927

(Plate No. 17)

Fig. A. Entire worm.

Fig. B. A part of body showing cirrus sac, ventral
sucker etc. enlarged (drawn from live specimen).

Fig. C. Egg enlarged.

FAMILY : OPISTHOLBETUDAE

Pycnadena pokhrayansis n.sp.

(Plate No. 18)

Host : Mystus vitattus (Cuv. & Bloch.)
Location : Intestine
Locality : Fish market Pokhrayan
No. of fish examined : 350
No. of fish infected : 2
No. of specimen collected : 35

Description

Body elongated, smooth, rounded anterior and tapering posterior ends. Oral sucker subterminal, spherical or rounded. Ventral sucker pre-equatorial, oval or spherical, large or equal than oral sucker. Pre-pharynx absent. Pharynx globular, muscular. Oesophagus absent. Intestinal caeca terminating at posterior end of body. Testes entire oval or rounded, parallel, very much closing to each other, just posterior to ventralsucker, more or less equal. Cirrus sac saccular anterior to ventralsucker below intestinal bifurcation. Vesicula seminalis small, pars prostatica small surrounded by large number of prostate gland cells. Ejaculatory duct narrow small. Ovary oval or oblong, anterior to ventral sucker, pre-equatorial. Receptaculum seminis, post-ovarian. Vitelline

follicles small or large extending from posterior region of ventral sucker up to hind end of body. Uterus arises from ootype, extending up to posterior testis then turns anteriorly and opens at genital pore. Eggs oval, large, operculated. Genital pore post bifurcal. Excretory bladder tubular, excretory pore terminal.

Measurements

Body length 1.625, width 0.485; oral sucker 0.195 x 0.195; ventral sucker 0.21 x 0.14; pre-pharynx absent; pharynx 0.06 x 0.08; oesophagus absent. Anterior testis 0.125 x 0.105; posterior testis 0.135 x 0.105; cirrus sac 0.115 x 0.06; vesicula seminalis 0.045 x 0.040; pars prostatica 0.015 x 0.010; ejaculatory duct 0.035 x 0.040; ovary 0.09 x 0.08; receptaculum seminis absent. Egg 0.07 x 0.035.

Discussion

The present form belongs to genus Pycnadena Linton 1911. So far eight species of this genus viz. P. lata Linton, 1910) Linton, 1911, P. pyriformae Price, 1934, P. komiyai Srivastava, 1962, P. africana Fischthal and William, 1971, P. cheilodactyli Evdokimove, 1971. P. bariliusi Kumari & Srivastava, 1975 have been reported from entire world. P.

betwai Agrawaland Sharma 1989 and P. indica Agrawaland Sharma, 1989. It differs from all the known speies in the position of testes which is equatorial, post-acetabular, more or less parallel to each other, in the position of ovary which is pre-acetabular, pre-equatorial and in the size of eggs.

Therefore, a new species P. pokhrayansis n.sp. is formed for its reception. New species is named after the name of the place from which the host is collected.

PLATE - 18

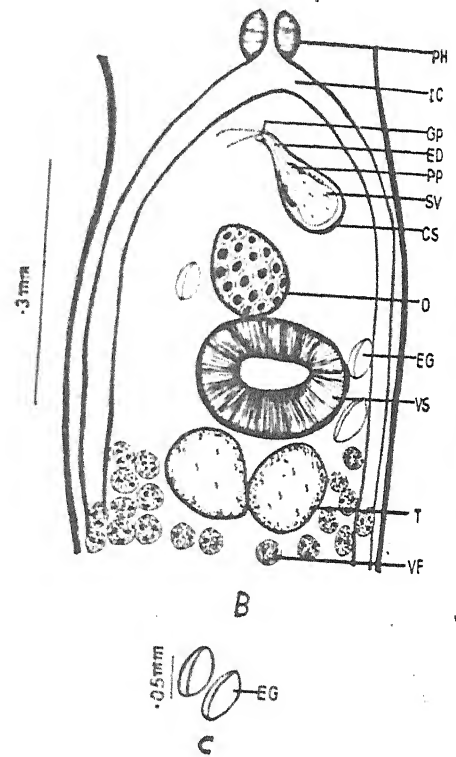
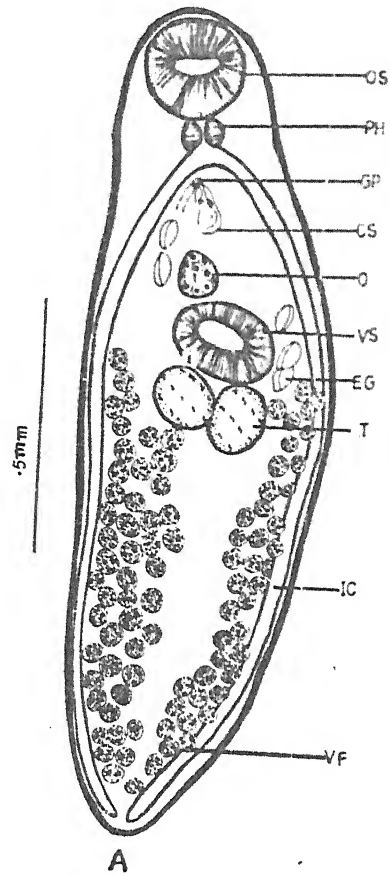


Fig. A.

Fig. B.

Fig. C.


Pycnadena pokhrayansis n.sp.

(Plate No. 18)

Fig. A. Entire worm.

Fig. B. Anterior part of body showing cirrus sac,
ovary, ventral sucker and testes etc. enlarged
(drawn from live specimen).

Fig. C. Eggs enlarged.



FAMILY : OPECOELIDAE

Neopodocotyle laxmibaii n.sp.

(Plate No. 19)

Host : Labio rohita (Ham.)
Location : Intestine
Locality : Kanpur Fish Market
No. of fish examined : 350
No. of fish infected : 1
No. of specimen collected : 4

Description

Body elongated, smooth, blunt anterior end, slightly tapering posterior end. Oral sucker subterminal, rounded. Ventral sucker pre-equatorial, spherical, larger than oral sucker. Pre-pharynx absent. Pharynx oval or rounded, muscular. Oesophagus long. Intestinal caeca reaching up to the posterior end of the body. Testes tandem, triangular, elongated, oval, post equatorial, posterior testis larger than the anterior testis. Cirrus sac elongated, extends from just behind posterior end of ventral sucker up to the intestinal bifurcation, encloses a bipartite vesicula seminalis, a short pars prostatica surrounded with numerous prostatic gland cells and a long narrow ejaculatory duct. Ovary pre-testicular, spherical or rounded, just post equatorial. Receptaculum

seminis pouch like, situated anterior to ovary. Uterus pretesticular, limited extends not beyond the anterior testis and finally opens through metraterm at the genital pore. Shell gland numerous and surrounded the ootype. Laurer's canal not seen. Eggs oval operculated. Genital pore median, bifurcal. Vitelline follicles extend from intestinal bifurcation up to hind end of body. Where they are merged together. Two vitelline duct unite to form a vitelline reservoir which opens at ootype through a common vitelline duct. Excretory bladder tubular and elongated, excretory pore at the hind end of body.

Measurements

Body length 2.080, width 0.640; oral sucker 0.155 x 0.145; ventral sucker 0.230 x 0.215; pre-pharynx absent. Pharynx 0.11 x 0.12; oesophagus 0.19 x 0.05; anterior testis 0.270 x 0.175; posterior testis 0.350 x 0.215; cirrus sac 0.545 x 0.60; vesicula seminalis 0.160 x 0.050; pars prostatica 0.095 x 0.020; ejaculatory duct 0.270 x 0.010; ovary 0.155 x 0.135; receptaculum seminis 0.17 x 0.07; egg 0.060 x 0.035.

Discussion

The genus Neopodocotyle was erected by Dayal in 1944, in a note, with N. indica as type species which was obtained from the intestine of Callichrous bimaculatus. Its detailed account

however, was published by him in 1950. Yamaguti, 1958 reduced it to a rank of subgenus under Podocotyle (Dujardin, 1845) Odhner, 1905 and was placed under the sub-family Allocreadinae Looss, 1902 of the family Allocreadiidae (Looss, 1902) Stossich, 1903. However, Mehra (1966) retained Neopodocotyle as a distinct genus under sub-family Plagioporinae Manter, 1947 of the family Opecoelidae Ozaki, 1925. Furthermore, Pritchard (1966) transferred M. indica under the genus Allocreadium as A. indica. Subsequently, Gupta and Chakrabarti (1967) described N. lucknowensis and Rai (1971) added N. mehrui from the intestine of Puntius sarana Yamaguti (1958) included under the genus Podocotyle five subgenera viz. Podocotyle (Dujardin, 1845) Odhner, 1905, Neopodocotyle Dayal, 1944, Apodocotyle Pritchard, 1966. Neopodocotyloides Pritchard, 1966 and Peduneulotrema Fischthal and Thomas, 1970. Baugh and Chakrabarti (1970) erected a new genus Puntiotrema on the basis of presence of genital sucker and named N. lucknowensis. Gupta and Chakrabarti, 1967, as P. lucknowensis. Rai (1971) and Pandey (1975) differ from Pritchard's view and considered Neopodocotyle as a distinct genus. However the writer agrees with Yamaguti (1958) and regards Neopodocotyle as a subgenus of Podocotyle because the position of uterus in between ovary and anterior testis is of

subgeneric importance.

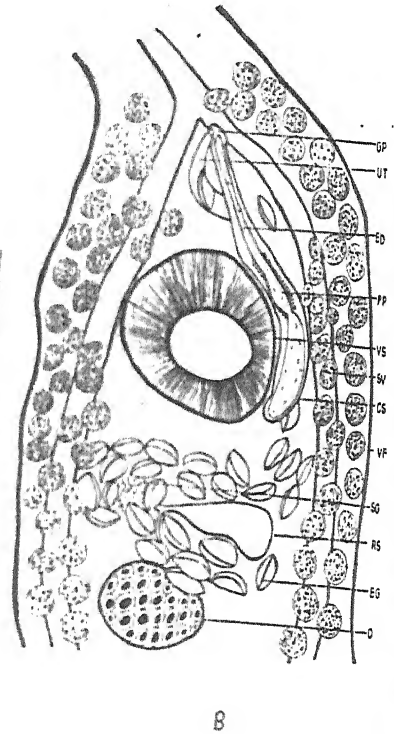
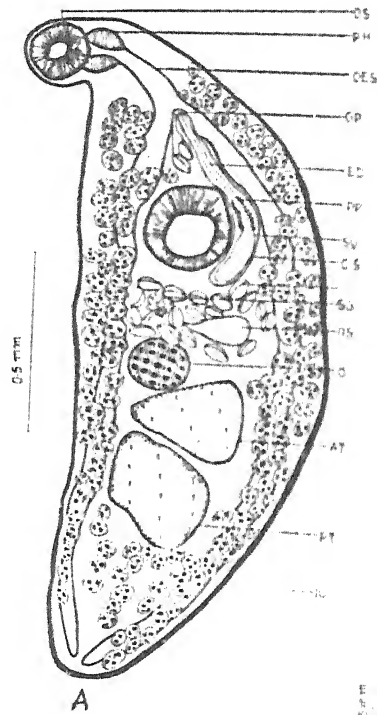
To the best of my knowledge, so far 7 species of the subgenus Neopodocotyle Dayal, 1944 are known viz. N. indica Dayal, 1944 from Callichrous bimaculatus, N. spinopora Sircar and Sinha, 1969 from Rita rita, N. mehrai Rai, 1971 from Puntius (Barbus) sarana and P. (Barbus) sophore, N. ballianensis Pandey, 1975 from P. (Barbus) sarana; N. chauhani Agrawaland Agrawal, 1980 from P. sarana and N. matatilaensis, Agrawaland Agrawal, 1980 from P. sophore. The present form chiefly differs from all the known species in the ratio and size of oral sucker and ventral sucker, in the size of posterior testis and in the extension of vitelline follicles.

It further differs from N. indica, N. spinopora, N. ballianensis and N. matatilaensis in the position of genital pore.

It also differs from N. mehrai in the size of oesophagus from N. dayali in the position of cirrus sac and from N. chauhani in the shape of the ovary and for the 1st time L. rohita is added as an additional host.

In the view of these differences the present form considered as new species with specific name N. laxmibaii n.sp. is named in the honour of Maharani Laxmibai, a brave freedom fighter of this country.

PLATE - 19



Neopodocotyle laxmibaii n.sp.

(Plate No. 19)

Fig. A. Entire worm.

Fig. B. A part of body showing position of cirrus
sac, ovary and receptaculum seminis etc.
enlarge (drawn from live specimen).

Fig. C. Eggs enlarged.

Neopodocotyle hanumanthai n.sp.

(Plate No. 20)

Host : Labio rohita (Ham.)
Location : Intestine
Locality : Fish market Kanpur
No. of fish examined : 350
No. of fish infected : 1
No. of specimen collected : 15

Description

Body elongated, smooth, slightly tapering anterior end and rounded posterior end. Oral sucker subterminal, spherical, rounded, ventral sucker pre-equatorial, rounded, larger than the oral sucker. Pre-pharynx absent. Pharynx rounded, muscular. Oesophagus short, tubular, thick. Intestinal caeca reaching upto the posterior end of the body. Testes tandem, rounded, posterior testis larger than the anterior testis. Cirrus sac elongated extend from just posterior to ventral sucker, up to intestinal bifurcation. Long vesicula seminalis, short pars prostatica, surrounded by numerous prostate gland cells and a long, narrow, tubular ejaculatory duct. Ovary pretesticular, pre-equatorial, rounded, posterior to ventral sucker. Receptaculum seminis post ovarian, pre-

testicular, slightly visible. Uterus pre-testicular, limited extend not beyond the anterior testis and finally opens through metraterm at genital pore. Shell glands numerous and surrounded the ootype. Laurer's canal not seen, eggs oval, operculated. Genital pore median, anterior to ventral sucker and situated middle of intestinal bifurcation and ventralsucker. Vitelline follicles extend from middle of ventral sucker up to hind end of body. Two vitelline ducts unite to form a vitelline reservoir. Which opens at ootype through a common vitelline duct. Excretory bladder tubular and elongated. Excretory pore at the hind end of body.

Measurements

Body length 2.80, width 0.88; oral sucker 0.210 x 0.270; ventral sucker 0.375 x 0.315; prepharynx absent, pharynx 0.095 x 0.16; oesophagus 0.05 x 0.045; anterior testis 0.340 x 0.355; posterior testis 0.440 x 0.345; cirrus sac 0.620 x 0.045; vesicula seminalis 0.18 x 0.055; pars prostatica 0.110 x 0.020; ejaculatory duct 0.310 x 0.010; ovary 0.250 x 0.220; receptaculum absent; egg 0.090 x 0.045.

Discussion

The genus Neopodocotyle was erected by Dayal in 1944, in

a note, with N. indica as type species which was obtained from the intestine of Callichrous bimaculatus. Its detailed account however, was published by him in 1950. Yamaguti, 1958 reduced in to a rank of subgenus under Podocotyle (Dujardin, 1845) Odhner, 1905 and was placed under the subfamily Allocreadinae Looss, 1902 of the family Allocreadiidae (Looss, 1902) Stossich, 1903. However, Mehra (1966) retained Neopodocotyle as distinct genus under subfamily Plagioporinae, Manter, 1947 of the family Opecoelidae Ozaki, 1925. Furthermore, Pritchard (1966) transferred N. indica under the genus Allocreadium as A. indica subsequently, Gupta and Chakrabarti (1967) described N. lucknowensis and Rai (1971) added N. mehrai from the intestine of Puntius sarana. Yamaguti (1958) included under the genus Podocotyle five subgenera viz., Podocotyle (Dujardin, 1845) Odhner, 1905, Neopodocotyle Dayal, 1944. Apopodocotyle Pritchard, 1966, Neopodocotyloides Pritchard, 1966 and Peduneulotrema Fishthal and Thomas, 1970. Baugh and Chakrabarti (1970) erected a new genus Puntiotrema on the basis of presence of genital sucker and named N. lucknowensis Gupta and Chakrabarti, 1967, as P. lucknowensis. Rai (1971) and Pandey (1975) differs from Pritchard's view and considered Neopodocotyle as distinct genus. However, the writer agrees with Yamaguti (1958) and regards Neopodocotyle as a subgenus

of Podocotyle because, the position of uterus in between ovary and anterior testis, is of subgeneric importance.

To the best of my knowledge, so far 8 species of the subgenus Neopodocotyl Dayal, 1944 are known viz. N. indica Dayal, 1944 from Callichrous bimaculatus; N. spinopora Sircar and Sinha, 1969 from Rita rita; N. mehrai Rai, 1971 from Pantius (Barbus) sarana and P. (Barbus) sophore, N. ballianensis Pandey, 1975 from labeo calbasu, N. dayali Pandey, 1975, from P. (Barbus) sarana, N. chauhani. Agrawal and Agrawal 1980 from P. sarana and N. matatilaensis Agrawal and Agrawal, 1980 from P. sophore and N. laxmibaii n.sp. earlier described by Agrawal and Sachan from Labio rohita.

The present form belongs to genus Neopodocotyle Dayal, 1944 and differs from N. sinopora, N. mehrai, N. balliansis, N. dayali, in the extension of cirrus sac, size of posterior testis, in the size of ventral sucker, and in the opening of genital pore.

It also differs from N. indica, N. chauhanai and N. matatiliansis by having short oesophagus and in the extension of vitelline follicles.

It further differs N. spinopora, N. ballansis, N. mehrai, N. dayali in the size of ventral sucker and presence of

parsprostatica, except in N. balliansis.

And it differs from N. laxmibaii in the size of oesophagus, in the ratio of ventral and oral; suckers in the position of ovary, shape of the testes, in the extension of vitelline follicles.

In the view of these differences the present form considered new species name Neopodocotyle hanumanthai n.sp.

The new species is named in the honour of Professor K. Hanumantha Rao, a reputed Parasitologist of this country.

PLATE - 20

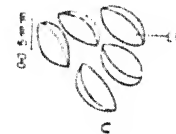
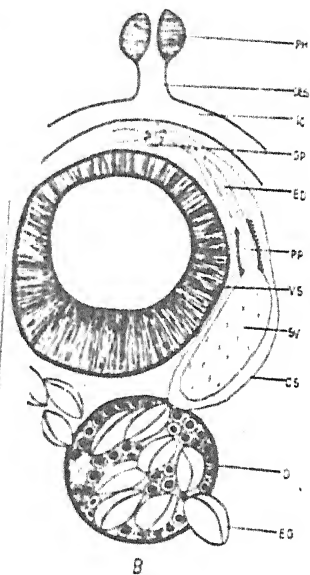
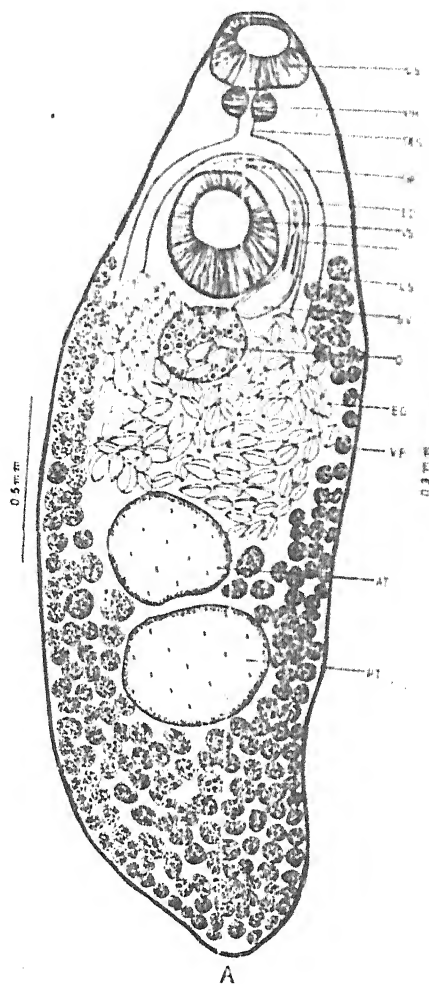


Fig. A.

Fig. B.

Fig. C.

Neopodocotyle hanumanthai n.sp.

(Plate No. 20)

Fig. A. Entire worm.

Fig. B. Anterior part of body showing position of
cirrus sac and ovary etc. enlarged
(drawn from live specimen).

Fig. c. Eggs enlarged.

Podocorchis gangi n.subgenus, n.sp.*

(Plate No. 21)

Host : Channa marulius (Ham. & Buck.)
 Location : Intestine
 Locality : Fish market Kanpur
 No. of fish examined : 200
 No. of fish infected : 2
 No. of specimen collected : 6

Description

Body smooth, elongated, eleptirical. Oralsucker subterminal, circular or spherical. Ventral sucker spherical or rounded, pre-equatorial, muscular, larger than oral sucker. Pre-pharynx absent. Pharynx rounded, muscular. Oesophagus tubular long or short. Intestinal caeca reaching up to hind end of body. Testes tandem or oval, just post equatorial, post-ovarian, posterior testis larger than anterior testis. Cirrus sac submedian, extend anterior to ventral sucker, marginal extracaecal, encloses vesicula seminalis sac like, small pars prostatica, surrounded with prostate gland cells. Ejaculatory

* A full length paper on this species has been accepted for publication in the journal "Indian Journal of Helminthology".

duct small tubular. Ovary irregular oval or rounded, equatorial, in between ventral sucker and anterior testis. Receptaculum seminis elongated, situated left of ovary. Uterus arises from ootype and extend up to prebifurcal region anterior testis. Shell glands numerous and surrounded the ootype. Laurer's canal present. Eggs oval, yellow, and operculated. Genital pore marginal, extracaecal at the oesophageal or middle of oralsucker level on left side or near the intestinal bifurcation. Vitelline follicles circumcaecal confined to hind body may or may not confluent in post testicular area two vitelline duct unite to form a vitelline reservoir, which opens at ootype by a commonvitelline duct. Excretory bladder tubular, reaching to ovary or more anteriorly.

Measurements

Body length 1.150-1.160, width 0.525-0.530; oralsucker 0.110-0.115 x 0.125-0.130; ventral sucker 0.180-0.185 x 0.150-0.155; pre-pharynx absent; parynx 0.045 x 0.064; oesophagus 0.04 x 0.025; anterior testis 0.225-0.260 x 0.110-0.115; posterior testis 0.265-0.270 x 0.130-0.135; cirrus sac 0.215-0.220 x 0.060-0.065; vesicula seminalis 0.085-0.090 x 0.050-0.055; pars prostatica 0.040-0.045 x 0.015; ejaculatory duct

0.080-0.085 x 0.010; ovary 0.130-0.135 x 0.060-0.065;
 receptaculum seminis 0.18 x 0.05; egg 0.060-0.065 x 0.030-
 0.035.

Discussion

The present form belongs to the subfamily Plagioporinae Manter, 1947 of the family Opecoelidae Ozaki, 1925. Yamaguti (1971) has recorded 22 genera. Under the subfamily Plagioporinae and since then four more genera have been added to this subfamily viz., Anthochoanocotyle by Kamegai, 1972, Olivacreadium by Bilqees, 1976, Godavaritrema by Kayrakarte and Yadav, 1976, Gangatrema by Agrawal and Kumar, 1980. The present form comes closer to Podocotyle (Dugardin, 1845) syn Sinistroporus Stafford, 1904 Allopodocotyle Prtichard, 1966.

Ventral sucker pre-equatorial, sessile testes tandem or obliquely tandem, post equatorial, towards the end of body. Cirrus pouch well developed, usually claviform, may or may not extend, posterior to ventral sucker. No external seminal vesicles. Genital pore usually submedian. Ovary submedian, pre-testicular. Receptaculum seminis and Larer's canal present. Vitellaria circumeocal. Excretory vesicle tubular, reaching to the ovary or more anteriorly, whereas it differs from Podocotyle in the position of genital pore, marginal, extracaecal at the oesophagial or middle of oral sucker level

and in the position of cirrus sac submedian, bifurcal, preacetabular, marginal extend up to the anterior margin of ventralsucker to oralsucker. In the opinion of the writer these characters are subgeneric importance. Therefore, in order to accumulate the present form a new subgenus Podocorchis is established with new species gangi n.sp.

The species is named after the name of the river Ganga from which the host is collected.

Subgeneric diagnosis

Opecolidae, Plagioporinae body elongated, smooth, eleptical. Oral sucker, subterminal, circular or rounded, ventralsucker spherical or rounded, pre-equatorial, muscular larger than the oral sucker. Pharynx rounded muscular. Oesophagus tubular, long or short. Intestinal caeca reaching up to hind end of body. Testes, tandem, just post equatorial, post ovarian, posterior testis larger than the anterior testis. Cirrus sac submedian extend up to ventral sucker to marginal, extracaecal, encloses vesicula seminalis sac like, small pars prostatica surrounded with prostate gland cells and a small ejaculatory duct present. Ovary oval, irregular equatorial, in between ventral sucker and anterior testis. Receptaculum seminis elongated, sac like, situated left of

ovary. Uterus arises from ootype and extend up to anterior testis to prebifurcal region. shell glands numerous and surrounded the ootype. laurer's canal present. Eggs oval, yellow and opeculated. Genital pore marginal, extracaecal at the oesophagial or middle of oral sucker level. On the left caecum near the intestinal bifurcation. Vitalline follicles circumcaecal, confined to hind body, may or may not confluent in post-testicular area. Two vitelline duct unite to form a vitelline reservoir which opens at ootype by a common vitelline duct. Excretory bladder tubular reaching to ovary or more anteriorly. Intestinal parasite of fresh water fishes.

"Key to subgenera of Podocotyle Pritchard, 1966"

1. Genital pore almost median bifurcal or post bifurcal Apopodocotyle
- Genital pore difinitly subedian 2
- or
- Genital pore marginal, extracaecal at the oesophageal or middle of oral sucker level 3
2. Ovary separated from anterior testis by uterus Neopodocotyle
- Ovary not separated from anterior testis by uterus 4
3. Vitelline follicles circumcaecal confined to hind body reaching up to oesophagus n.sub.gen.
- Vitelline follical circumcaecal confined to hind body may or may not confluent in post testicular area 4
4. Acetabulum distinctly pedunculate 5
- Acetabulum not distinctly pedunculate Podocotyle
5. Seminal vesicle constricted into two portions posteriorly Pedunculotrema
- Seminal vesicle not constricted into two portions posteriorly Neopodocotyloides

PLATE - 21

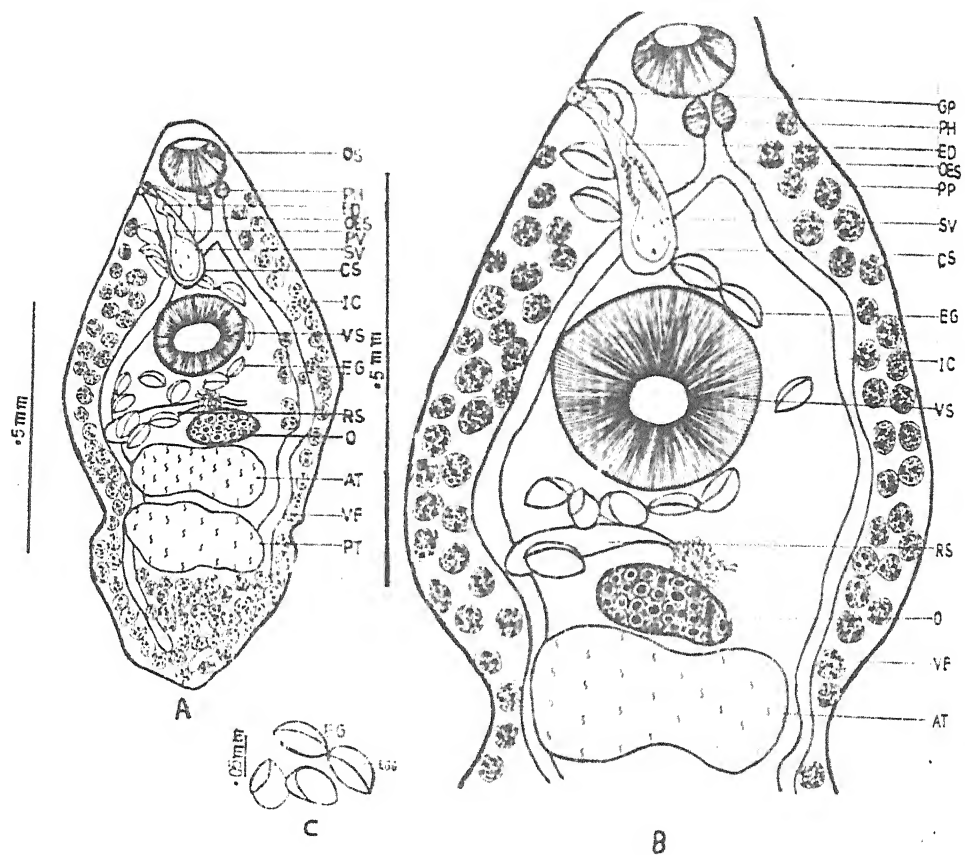


FIG. A. Ed

FIG. B. A

FIG. C.

123
Podocorchis gangi n.subgenus, n.sp.*

(Plate No. 21)

Fig. A. Entire worm.

Fig. B. A part of body showing cirrus sac, ovary,
receptaculum seminis, ventral sucker etc.
enlarged (drawn from live specimen).

Fig. C. Egg enlarged.

Podocorchis maruli n.sp.

(Plate No. 22)

Host : Channa marulius (Ham. & Buch.)
 Location : Intestine
 Locality : Fish market Kanpur
 No. of fish examined : 200
 No. of fish infected : 2
 No. of specimen collected : 4

Description

Body smooth, elongated, slightly tapering anterior end and rounded posterior end. Oral sucker sub-terminal, rounded, spherical or oval. Ventral sucker pre-equatorial half extra and half intra caecal, rounded or spherical, muscular, larger than the oral sucker. Pre-pharynx short. Pharynx rounded or oval, muscular. Oesophagus short. Intestinal caeca reaching up to hind end of body. Testes tandem or obliquely tandem, oval, equal post ovarian, situated hind region of body. Cirrus sac submedian, extend anterior to the ventral sucker, marginal, extracaecal, encloses vesicula seminalis small sac like, small pars prostatica surrounded with numerous prostate gland cells. Ejaculatory duct small tubular. Ovary oval or rounded, just post equatorial. Receptaculum seminis sac like, pre-ovarian.

Uterus arises from ootype extend up to marginal prebigurcal to anterior testis. Shell glands numerous and surrounded the ootype. Laurer's canal present. Eggs oval operculated yellow. Genital pore marginal, extracaecal, at the intestinal bifurcal level. Vitelline follicles circum caecal confined to hind body may or may not confluent in post testicular area. Two vitelline duct unite to form a vitelline reservoir which opens at ootype by a common vitelline duct. Excretory bladder tubular reaching to ovary or more anteriorly.

Measurements

Body length 1.13-1.14; width 0.513-0.520; oral sucker 0.110-0.115, width 0.10-0.12; ventralsucker 0.220-0.225 x 0.21-0.215; pre-pharynx 0.02 x 0.02; pharynx 0.06 x 0.1; oesophagus 0.035 x 0.030; anterior testis 0.220-0.225 x 0.130-0.135; posterior testis 0.220-0.225 x 0.130-0.135; cirrus sac 0.135-0.140 x 0.06-0.062; vesicula seminalis 0.035-0.040 x 0.04-0.04; pars prostatica 0.03-0.035 x 0.015; ejaculatory duct 0.110-0.105 x 0.01; ovary 0.130-0.135 x 0.085-0.090; receptaculum seminis 0.08 x 0.035; egg 0.065-0.070 x 0.035-0.040.

Discussion

The present form belongs to subgenus Podocorchis. It differs from known species P. gangi in the position and size of cirrus sac, in the position of genital pore, in the size of ovary and shape of testes.

It is, therefore, regarded as a new species P. marulii n.sp. the name of the new species is given after the name of the host from which parasite is collected.

PLATE - 22

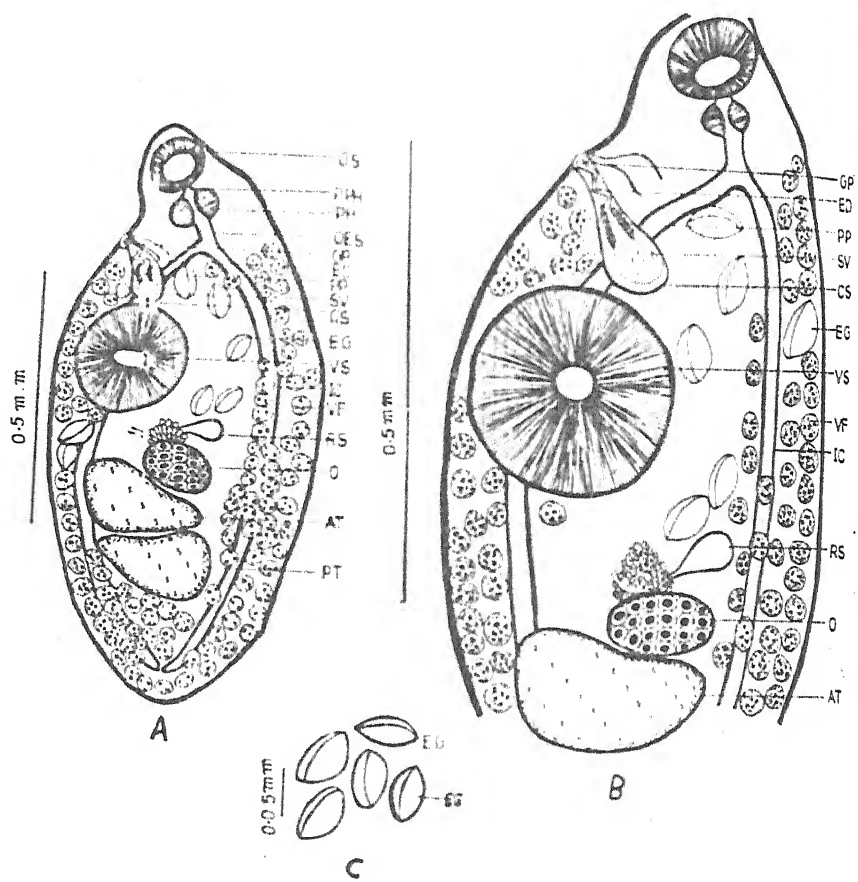


Fig. A.

Fig. B.

Fig. C.

Podocorchis maruli n.sp.

(Plate No. 22)

Fig. A. Entire worm.

Fig. B. A part of body showing cirrus sac, ovary,
ratio of ventral and oral sucker, receptaculum
seminis etc. enlarged (drawn from live specimen).

Fig. C. Egg enlarged.

Podocorchis vittatus n.sp.*

(Plate No. 23)

Host	:	<u>Mystus vittatus</u> (Cuv. & Bloch.)
Location	:	Intestine
Locality	:	Kanpur fish market
No. of fish examined	:	350
No. of fish infected	:	1
No. of specimen collected	:	4

Description

Body smooth, elongated, rounded anterior and slightly tapering posterior ends. Oral sucker subterminal, rounded, oval or spherical, muscular, larger than ventralsucker. Ventral sucker pre-equatorial, muscular. Pre-pharynx absent. Pharynx oval or rounded muscular. Oesophagus absent. Intestinal caeca reaching up to hind end of body. Testes tandem or obliquely tandem, equatorial or post equatorial, elongated, oval, unequal, anterior testis larger than posterior testis. Cirrus sac submedian, extending up to anterior to ventral sucker. Long tubular vesicula seminalis, long pars prostatica,

* A full length paper on this genus and species has been communicated for publication in the "Journal of Scientific Research", Banaras Hindu University, Banaras.

surrounded with numerous prostate gland cells. Ejaculatory duct long tubular. Ovary spherical, rounded or oval, post acetabular or situated in between ventral sucker and anterior testis. Receptaculum seminis small sac like. Uterus arises from ootype, extend up to anterior testis, numerous shell glands surrounded the ootype. Laurer's canal present. Eggs rounded, embryonic, yellow or black, non-operculated. Genital pore marginal, extracaecal at the prepharyngeal level on left side. Vitelline follicles extending from acetabulum to hind end of body, intra and extracaecal. Two vitelline duct unite to form a vitalline reservoir which opens at ootype by a common vitalline duct. Excretory bladder tubular reaching to ovary or more anteriorly.

Measurements

Body length 2.35, width 0.50; oral sucker 0.260 x 0.240; ventralsucker 0.190 x 0.210; pre-pharynx absent; pharynx 0.030 x 0.075; oesophagus absent. Anterior testis 0.240 x 0.115; posterior testis 0.255 x 0.090; cirrus sac 0.565 x 0.055; vesicula seminalis 0.075 x 0.050; pars prostatic 0.180 x 0.030; ejaculatoryduct 0.380 x 0.010; ovary 0.180 x 0.125; receptaculum semin 0.10 x 0.05; gg 0.055 x 0.040.

Discussion

The present form belongs to sub genus Podocorchis of Podocotyle (Dujardin, 1845) Synsinistroporus Stafford, 1904. Allopodocotyle Pritichard, 1966. It differs from its known species P. maruli having large oral sucker than ventral sucker in the shape and position of testes, extension of vitelline follicles and in the egg which are embryonated in order to accumulate the present form a new species P. vittatusi is established. The species is named after the name of host from which parasite is collected.

PLATE - 23

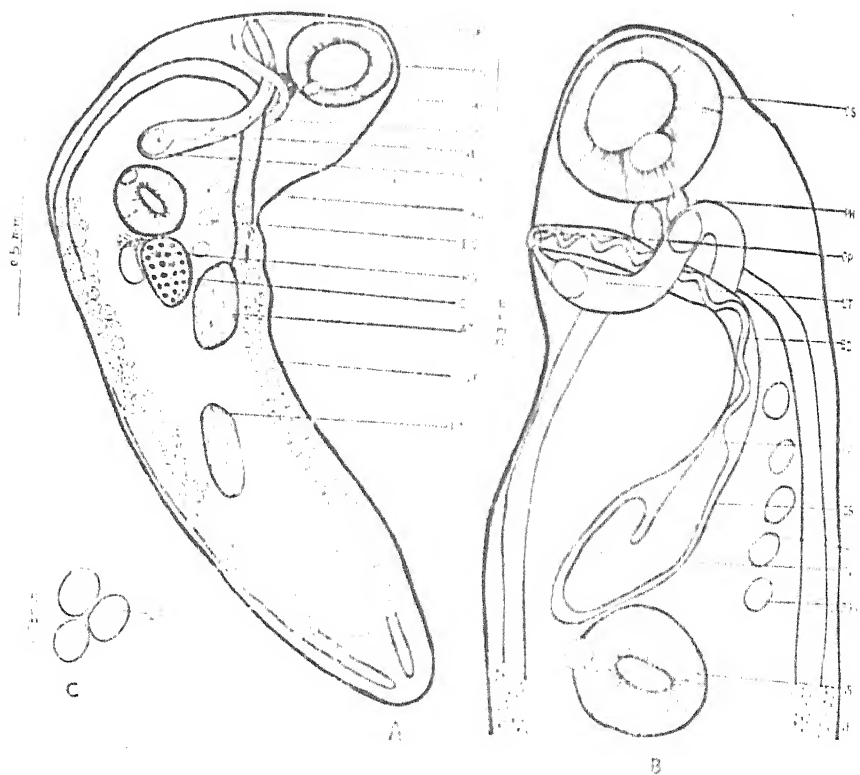


FIG.

FIG.

FIG.

Podocorchis vittatusi n.sp.*

(Plate No. 23)

Fig. A. Entire worm.

Fig. B. Anterior part of body showing cirrus sac,
ventral sucker and position of genital pore
etc. enlarged (drawn from live specimen).

Fig. C. Egg enlarged.

Eucreadium satpali n.sp.*

(Plate No. 24)

Host : Oxygaster bacaila (Ham.)
Location : Intestine
Locality : Fish market Kanpur
No. of fish examined : 200
No. of fish infected : 2
No. of specimen collected : 5

Description

Body elongated, smooth, with rounded anterior and tapering posterior end. Oral sucker subterminal, large, spherical or oval with minute spines. Ventral sucker pre-equatorial, spherical or rounded and larger than oral sucker. Pre-pharynx absent. Pharynx oval, globular and muscular. Oesophagus absent. Intestinal caeca massive and thick rinkeled, reaching up to posterior end of body. Testes obliquely tandem, more or less equal, post equatorial, just post ovarian. Cirrus sac extends from middle of the ventral sucker extend up to the just intestinal bifurcation,

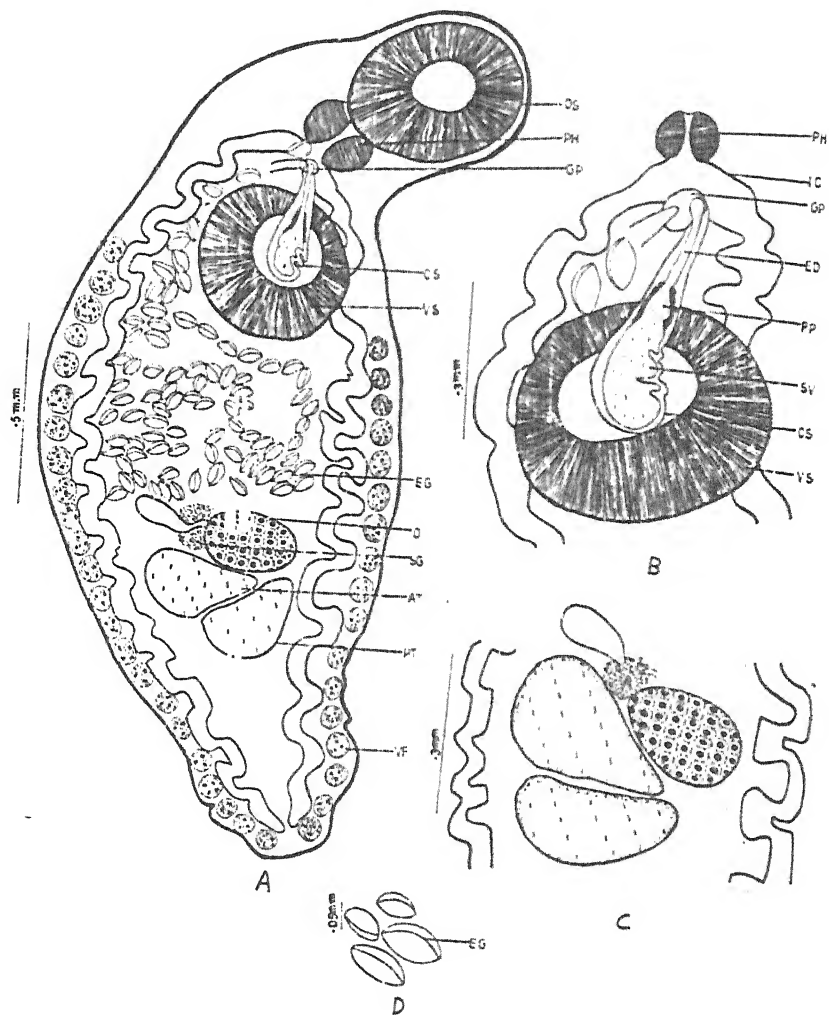
* A full length paper on this species has been communicated for publication in the journal "Indian Journal of Helminthology".

intercaecal, enclosing M shaped vesicula seminalis. A tubular pars prostatica surrounded with prostate gland cells and a short ejaculatory duct. Ovary entire oval or rounded, just post-equatorial, pre-testicular. Receptaculum seminis elongated, sac like and pre-testicular. Uterus extends up to anterior testis, and finally opens at genital pore by a metraterm. A large number of shell glands surrounded the ootype. Laurer's canal present. Eggs oval large, operculated. Genital pore at the level of intestinal bifurcation, intercaecal. Vitelline follicles extend from posterior region of ventral sucker up to the hind end of body. Two vitelline duct unite to form a vitelline reservoir, which opens at ootype by a short duct. Excretory bladder tubular, excretory pore terminal.

Measurements

Body length 2.540, width 0.870; oralsucker 0.470 x 0.360; ventral sucker 0.410 x 0.380; pre-pharynx absent, pharynx 0.130 x 0.200; oesophagus absent. Anterior testis 0.285 x 0.165; posterior testis 0.260 x 0.150; cirrus sac 0.340 x 0.090; vesicula seminalis 0.115 x 0.045; pars prostatica 0.070 x 0.025; ejaculatory duct 0.125 x 0.020; ovary 0.245 x 0.165; receptaculum seminis 0.15 x 0.06; egg 0.060 x 0.035.

PLATE - 24



Eucreadium satpalai n.sp.*

(Plate No. 24)

Fig. A. Entire worm.

Fig. B. Showing cirrus sac enlarged
(drawn from live specimen)

Fig. C. A part of body showing ovary, receptaculum, testes
etc. enlarged (drawn from live specimen).

Fig. D. Eggs enlarged.

Nicolla chauhani n.sp.*

(Plate No. 25)

Host	:	<u>Mastacembelus armatus</u> (Lac.)
Location	:	Intestine
Locality	:	Fish market Kanpur
No. of fish examined	:	500
No. of fish infected	:	2
No. of specimen collected	:	6

Description

Body elongated, rounded anterior and posterior ends. Oral sucker subterminal, muscular, oval or rounded, larger than ventral sucker. Ventralsucker pre-equatorial, muscular circular or oval. Pharynx small, rounded, muscular. Oesophagus absent. Intestinal caeca united near posterior end of body. Testes oval, equatorial, unequal, obliquely tandem. Cirrus sac elongated, large. Genital pore in between oral sucker. Vesicula seminalis sac like. Pars prostatica large surrounded with large number of prostate gland cells. Ejaculatory duct long tubular. Ovary sub equatorial, rounded or oval, or

* A full length paper on this species has been communicated for publication in the journal "Indian Journal of Helminthology".

spherical, in between anterior and posterior testis, situated right side of anterior testis. Receptaculum seminis pretesticular, small. Vitelline follicles extending from anterior region of oral sucker up to posterior end of body. Uterus arises from ootype extending anteriorly and opens at genital pore. Eggs oval, large, operculated. Genital pore at the posterior end of oral sucker. Excretory bladder tubular, reaching up to posterior testis, excretory pore terminal.

Measurements

Body length 1.28, width 0.30; oral sucker 0.270 x 0.145; ventral sucker 0.10 x 0.09; prepharynx absent; pharynx 0.03 x 0.015; oesophagus absent. Anterior testis 0.085 x 0.055; posterior testis 0.095 x 0.055; cirrus sac 0.330 x 0.075; vesicula seminalis 0.115 x 0.055; pars prostatica 0.055 x 0.035; ejaculatory duct 0.130 x 0.010; ovary 0.085 x 0.090; receptaculum seminis 0.025 x 0.01; egg 0.110 x 0.075.

Discussion

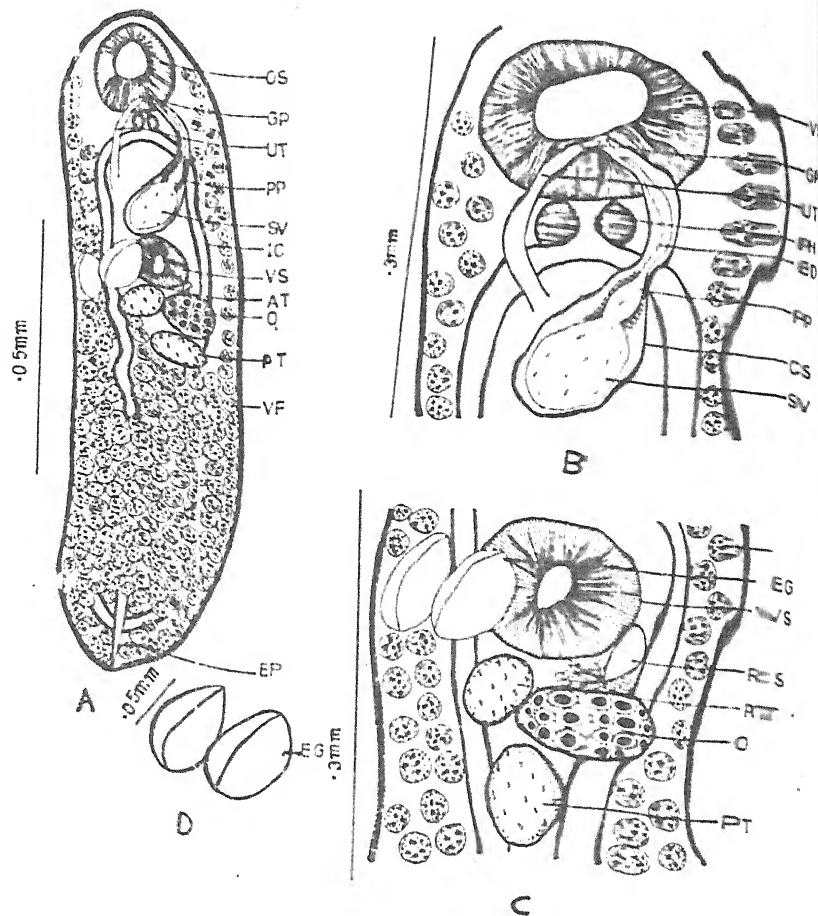
The present form belongs to genus Nicolla Wisniewski, 1934 with N. skrijabini its genotype. So far 10 other species of this genus viz., N. testioobliqua Wisniewski, 1933. N. macrostomum (Pigulewsky, 1931) Wisniewski, 1934. N. wisniewsk Slusarki, 1958. N. timoni Rebee et Giudicelli, 1959. N.

indica Srivastava, 1968. N. allahabadensis Srivastava, 1968 and N. halichoeri Overstreet, 1969. N. ritai Agrawal and Sharma, 1989. N. fotedari Agrawal and Sharma, 1989 have been reported from entire world.

It differs from all the known species of this genus in having oral sucker larger than ventralsucker, in the position of the ovary, in the size of eggs and in the position of testes which is more or less in the equatorial region. Therefore, a new species N. chauhani n.sp. is formed for its reception.

The new species is named in the honour of Dr. B.S. Chauhan, a well reputed Helminthologist of India.

PLATE. 25



Nicolla chauhani n.sp.*

(Plate No. 25)

Fig. A. Entire worm.

Fig. B. Anterior part of body showing cirrus sac
(drawn from live specimen).

Fig. C. A part of body showing position of testis, ovary,
ventral sucker and eggs etc. enlarged (drawn from
live specimen).

Fig. D. Egg enlarged.

Nicolla dayalii n.sp.*

(Plate No. 26)

Host	:	<u>Rita rita</u> (Ham.)
Location	:	Intestine
Locality	:	Fish market Kanpur
No. of fish examined	:	300
No. of fish infected	:	1
No. of specimen collected	:	5

Description

Body elongated, spinose, rounded anterior and slightly tapering posterior end. Oral sucker subterminal, oval or rounded or spherical, spinose, larger than ventral sucker. Ventral sucker rounded, or oval, pre-equatorial. Prepharynx absent. Pharynx globular, muscular. Oesophagus small, tubular or long. Intestinal caeca united at the posterior end of body. Testes entire, just post equatorial tandem, or obliquely tandem, oval, overlapping or separated from each other, unequal. Cirrus sac elongated, extend from just anterior to ventral sucker up to oral sucker. Vvesicula seminalis

* A full length paper on this species has been communicated for publication in the journal "Indian Journal of Helminthology".

bipartite. Pars prostatica small, surrounded by numerous prostate gland cells. Ejaculatory duct long narrow. Ovary circular or oval, just pre-equatorial or equatorial. Receptaculum seminis-rounded, sac like, postovarian. Vitelline follicles extending from post testicular area up to hind end of body, confluent post testicular region, uterus arises from ootype, runs posteriorly then turns anteriorly to opens at genital pore. Eggs very small, ovoid, genital pore posterior to oral sucker or middle of oral sucker. Excretory bladder simple tubular excretory pore terminal.

Measurements

Body length 1.620, width 0.240, oral sucker 0.150 x 0.175; ventral sucker 0.130 x 0.105; pre-pharynx absent; pharynx, 0.045 x 0.055; oesophagus, 0.03 x 0.02, anterior testis 0.060 x 0.045; posterior testis 0.070 x 0.045; cirrus sac 0.440 x 0.040; vesicula seminalis 0.130 x 0.05; pars prostatica 0.085 x 0.010; ejaculatory duct 0.190 x 0.010; ovary 0.065 x 0.055; receptaculum seminis 0.08 x 0.06; egg 0.015 x 0.010.

Discussion

The new form belongs to genus Nicolla Wisniewask, 1934 with N. skrijabini and its genotype. So far eleven other

species are known viz. N. testiobliqua Wisniewski, 1933, N. macrostomum (Pigulewsky, 1931) Wisniewski, 1934, N. wisniewske Slusarki, 1958, N. timoni Rebeeq et Giudicell, 1959, N. indica Srivastava, 1968, N. allahabadensis Srivastava, 1968, N. halichoari Overstreet, 1969, N. fotedari Agrawal & Sharma, 1989, N. ritai Agrawaland Sharma, 1989, N. chauhani, Agrawal & Sachan, 1993 Mastacembelus armetus (Lac.). The present form differs from all the known species, in the presence of spines only in oral sucker region, in the presence of oesophagus, in the position and size of testes, in the extension of vitelline follicles, in the extension of cirrus sac up to pre acetabular.

Therefore it is regarded as new species with specific name N. dayalii n.sp.

The new species is named in the honour of Late Professor J. Dayal reputed helminthologist of the country.

PLATE - 26

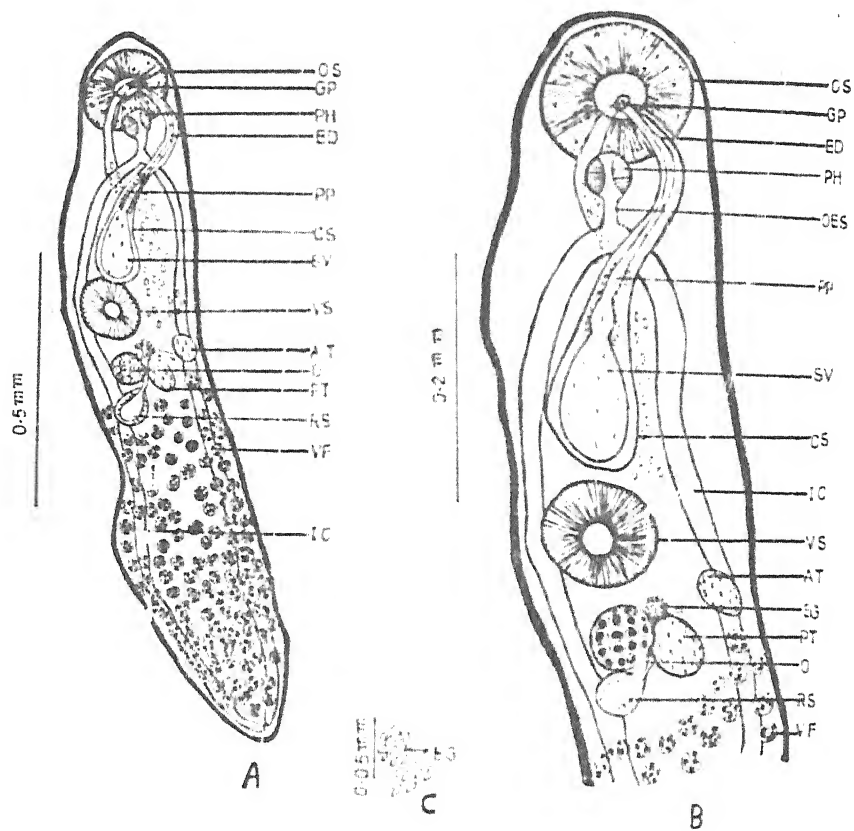


Fig. A.

Fig. B.

Fig. C.

Nicolla dayalii n.sp.*

(Plate No. 26)

Fig. A. Entire worm.

Fig. B. Anterior part of body showing cirrus and ventral sucker, ovary, testes etc. enlarged (drawn from live specimen).

Fig. C. Eggs enlarged.

Nicolla dayalii n.sp.*

(Plate No. 26)

Fig. A. Entire worm.

Fig. B. Anterior part of body showing cirrus sac , ventral sucker, ovary, testes etc. enlarged (drawn from live specimen).

Fig. C. Eggs enlarged.

Nicolla skrijabini (Iwanitzky, 1928) Wisniewski, 1933

(Plate No. 27)

Host	:	<u>Rita rita</u> (Ham.)
Location	:	Intestine
Locality	:	Fish market. Kanpur
No. of fish examined	:	300
No. of fish infected	:	8
No. of specimen collected	:	35

Description

Body elongated, smooth, rounded both ends. Oral sucker subterminal, spherical or subspherical. Ventral sucker spherical or rounded, larger, or more or less equal to oral sucker. Prepharynx absent or present. Pharynx globular muscular, large. Oesophagus absent or present. Intestinal caeca united at posterior end of body. Testes entire, spherical or rounded, triangular or double shaped or elongated unequal, post-equatorial, tandem or obliquely tandem, overlapping or separated, anterior testis smaller than the posterior testis. Cirrus sac small, sac like. Vesicula seminalis small, bipartite, pars prostatica small, surrounded by a large number of prostate gland cells. Ejaculatory duct narrow, small. Ovary oval, rounded, posterior to the ventral

sucker, pretesticular. Receptaculum seminis ovoid, pretesticular, pre-equatorial. Vitelline follicles extending anterior end of oral sucker up to posterior end of body. Uterus arises from ootype, intercaecal and extracaecal, opening at genital pore. Egg small oval, non-operculated. Genital pore post bifurcal.

Excretory bladder tubular, excretory pore terminal.

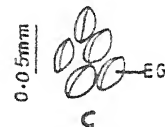
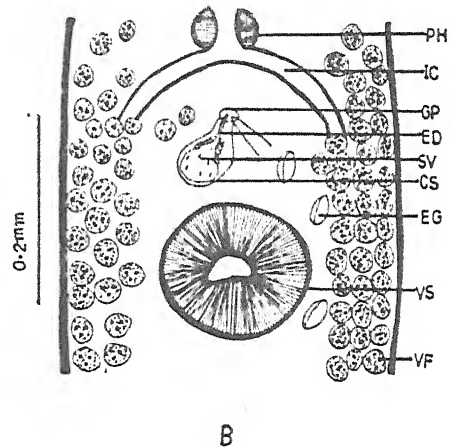
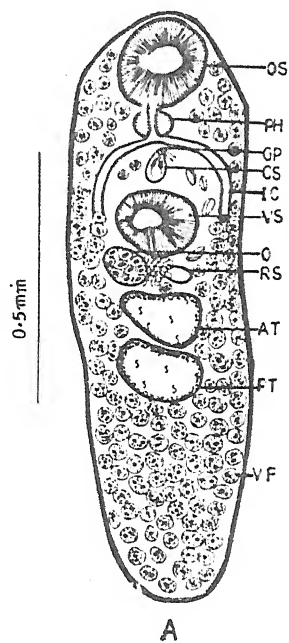
Measurements

Body length 1.155, width 0.360; oral sucker 0.180 x 0.170, ventral sucker 0.125 x 0.155; prepharynx absent, pharynx 0.06 x 0.08; oesophagus absent; anterior testis 0.108 x 0.150; posterior testis 0.110 x 0.170, cirrus sac 0.07 x 0.04, vesicula seminalis 0.025 x 0.020; pars prostatica 0.020 x 0.005; ejaculatory duct 0.015 x 0.005; ovary 0.09 x 0.07; receptaculum seminis 0.05 x 0.03; egg 0.035 x 0.020.

Discussion

The present form belongs to genus Nicolla Wisniewski, 1934. It closely resemble N. skrijabini Wisniewski, 1934, but differs from it in the extension of cirrus sac, in the extension of vitelline follicles and in the position of genital pore. These differences are considered as individual variations.

PLATE - 27



Nicolla skrijabini (Iwanitzky, 1928) Wishiewski, 1934

(Plate No. 27)

Fig. A. Entire worm.

Fig. B. Anterior part of body showing cirrus sac ventral sucker, extension of vitelline follicles, etc. enlarged (drawn from live specimen).

Fig. C. Egg enlarged.

Nicolla halichoeri Overstreet, 1969

(Plate No. 28)

Host : Rita rita (Ham.)
Location : Intestine
Locality : Fish market Kanpur
No. of fish examined : 300
No. of fish infected : 1
No. of specimen collected : 8

Description

Body elongated, smooth, rounded both ends, oral sucker subterminal, subspherical. Ventral sucker spherical or subspherical, pre-equatorial, larger or equal than oralsucker. Pre-pharynx absent. Pharynx globular, muscular. Oesophagus very small. Intestinal caeca united near posterior end of body. Testes rounded, subspherical, unequal, post-equatorial, tandem or obliquely tandem, anterior testis larger than posterior testis. Cirrus sac, sac like, extending from in between intestinal bifurcation and ventral sucker. Vesicula seminalis bipartite. Pars prostatica small, surrounded by a large number of prostate gland cells. Ejaculatory duct narrow short. Ovary oval or rounded, equatorial. Receptaculum seminis lateral or pre-ovarian, small. Vitelline follicles extending

from the level of ovary or posterior to ventral sucker, up to posterior end of body. Uterus arises from ootype then turns anteriorly and opens at genital pore. Egg large, operculated. Genital pore extracaecal, at the level of pharynx. Excretory bladder tubular, extending up to testis. Excretory pore terminal.

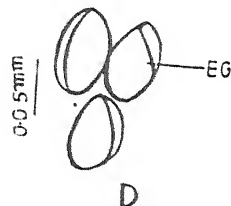
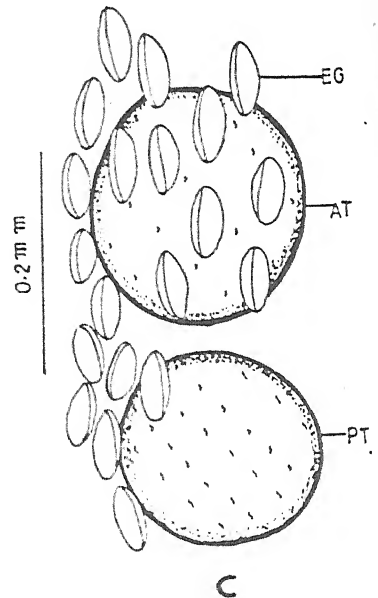
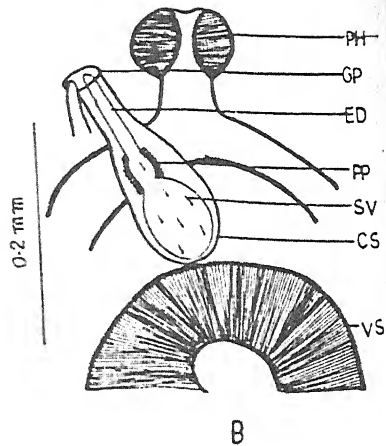
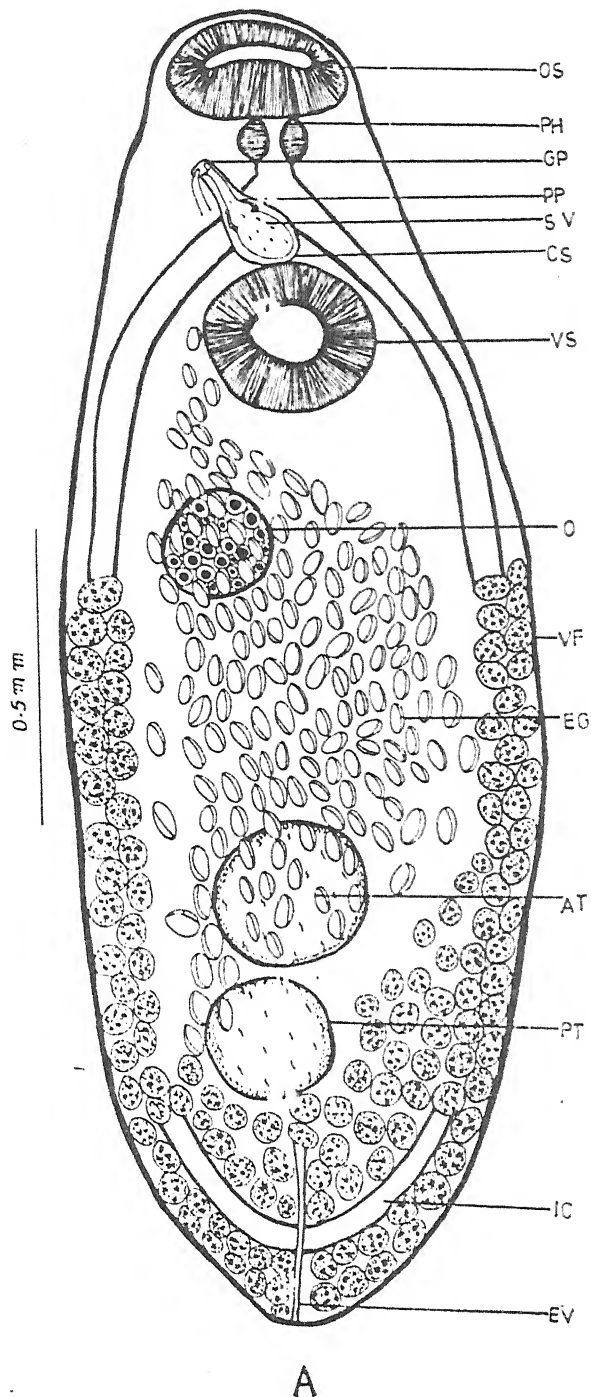
Measurements

Body length 2.20, width 0.78; oral sucker 0.165 x 0.295; ventral sucker 0.250 x 0.270; pre-pharynx absent; pharynx 0.07 x 0.11; oesophagus 0.025 x 0.060; anterior testis 0.240 x 0.250; posterior testis 0.20 x 0.21; cirrus sac 0.220 x 0.100; vesicula seminalis 0.085 x 0.070; pars prostatica 0.035 x 0.055; ejaculatory duct 0.085 x 0.020; ovary 0.185 x 0.185; receptaculum absent; egg 0.055 x 0.035.

Discussion

The present form belongs to genus Nicalla Wisniewski, 1934, it closely resembles with N. halichoeri Overstreet, 1969 but differs from it absence of pre-pharynx. Short oesophagus in the position, shape and size of testes and in the extension of vitelline follicles. These characters have been considered as individual variations and first time recorded this host.

PLATE - 28



Nicolla halichoeri Overstreet, 1969

(Plate No. 28)

Fig. A. Entire worm.

Fig. B. A part of body showing cirrus sac
(drawn from live specimen).

Fig. C. A part of body showing testis
(drawn from live specimen).

Fig. D. Egg enlarged.

(Plate No. 29)

Host : Rita rita (Ham.)
Location : Intestine
Locality : Fish market Kanpur
No. of fish examined : 300
No. of fish infected : 1
No. of specimen collected : 3

Description

Body elongated, smooth, rounded both ends. Oral sucker subterminal, spherical, subspherical. Ventral sucker subspherical, pre-equatorial, larger than oral sucker. Pre-pharynx absent. Pharynx rounded, muscular. Oesophagus short or long. Intestinal caeca united near posterior end of body.

Testes tandem or obliquely tandem, oval or rounded, post-equatorial, equal. Cirrus sac long extending from genital pore up to anterior end of ventral sucker. Vesicula seminalis bipartite. Pars prostatica small, surrounded by a large number of prostate gland cells. Ejaculatory duct narrow long. Ovary oval, or rounded, equatorial, pretesticular, post acetabular. Receptaculum seminis, preovarian. Vitelline follicles extending from level of oesophagus up to posterior end of

body. Uterus arises from ootype, extending anteriorly and opens at genital pore. Egg large, operculated. Genital pore extra caecal, at the level of posterior end of oralsucker.

Excretory bladder tubular, extend up to testes, excretory pore terminal.

Measurements

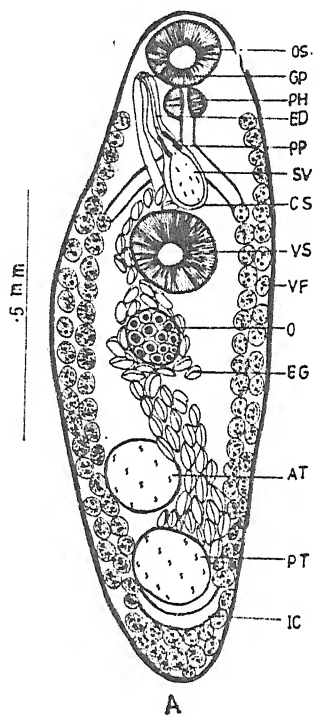
Body length 1.33, width 0.43; oral sucker 0.125 x 0.140; ventral sucker 0.180 x 0.155; pre-pharynx absent; pharynx 0.055 x 0.04; oesophagus 0.05 x 0.025; anterior testis 0.145 x 0.140; posterior testis 0.160 x 0.135; cirrus sac 0.290 x 0.060; vesicula seminis 0.110 x 0.060; pars prostatica 0.050 x 0.020; ejaculatory duct 0.115 x 0.010; ovary 0.115 x 0.105; receptaculum seminis absent; egg 0.050 x 0.025.

Discussion

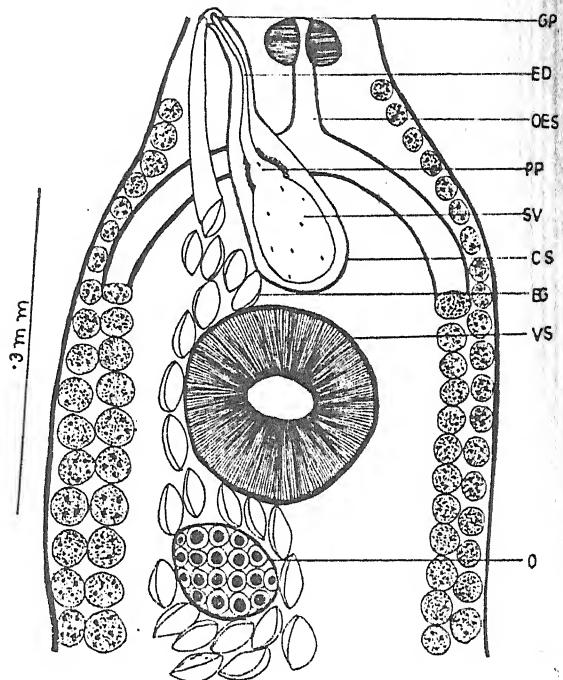
The present form belongs to genus Nicolla Wisniewski, 1934. It closely resembles with N. indica Srivastava, 1968 but differs from it, in the absence of pre-pharynx, size and shape of testes, in the position of ovary, in the extension of cirrus sac and opening of genital pore.

These characters have been considered as individual variations. It is added as an additional host.

PLATE - 29



A



B



C

Nicolla indica Srivastava, 1968

(Plate No. 29)

Fig. A. Entire worm.

Fig. B. Anterior part of body showing cirrus sac, ventral sucker, ovary etc. enlarged (drawn from live specimen).

Fig. C. Egg enlarged.

Neopeeocelina fotedari n.sp.*

(Plate No. 30)

Host : Mystus vitattus (Cuv. & Bloch.)
Location : Intestine
Locality : Fish market Ghatampur
No. of fish examined : 350
No. of fish infected : 1
No. of specimen collected : 4

Description

Body elongated, smooth, bluntly rounded anterior and tapering posterior ends. Oral sucker sub-terminal, oval or spherical. Ventral sucker pre-equatorial, rounded or oval and larger than oral sucker. Pre-pharynx absent. Pharynx spherical, muscular. Oesophagus long. Intestinal caeca reaching up to the posterior end of body and opens in to the excretory vesicle, near the excretory pore in a common atrium. Testes rounded or oval, tandem or obliquely tandem, anterior testis just post. mid equatorial region of body. Cirrus sac large, oval, sac like. Vesicula seminalis short. Pars prostatica, surrounded by

* A full length paper on this species has been communicated for publication in the journal "Indian Journal of Helminthology".

number of prostate gland cells. Small ejaculatory duct, cirrus not visible. Ovary oval or rounded, equatorial, pre-testicular near left side of ventralsucker. Oviduct arises anterior side of ovary, opens at the ootype. Receptaculum seminis oval, lying anterior to the ovary, small Laurer's canal opens at ootype near the opening of receptaculum seminis. Large number of small mehlis gland cells surrounded the ootype. Uterus limited extend not beyond anterior testis and opens through a short metraterm at genital pore. Egg oval, operculated. Genital pore median below the intestinal bifurcation. Vitelline follicles large, extend up to the middle level of ventral sucker to posterior end of body. Two vitelline ducts unite to form a vitelline reservoir, opens at ootype through a vitelline duct. Excretory bladder long, tubular, extending behind posterior testis to the posterior end of the body, opens out side through an atrium.

Measurements

Body length 2.475, width 0.560; oral sucker 0.240 x 0.230; ventralsucker 0.255 x 0.215; pre-pharynx absent; pharynx 0.05 x 0.08; oesophagus 0.11 x 0.025; anterior testis 0.125 x 0.125; posterior testis 0.105 x 0.105; cirrus sac 0.145 x 0.095; vesicula seminalis 0.040 x 0.065; pars

prostatica 0.050 x 0.055; ejaculatory duct 0.045 x 0.015;
 ovary 0.140 x 0.140; receptaculum seminis 0.16 x 0.08; egg
 0.115 x 0.050.

Discussion

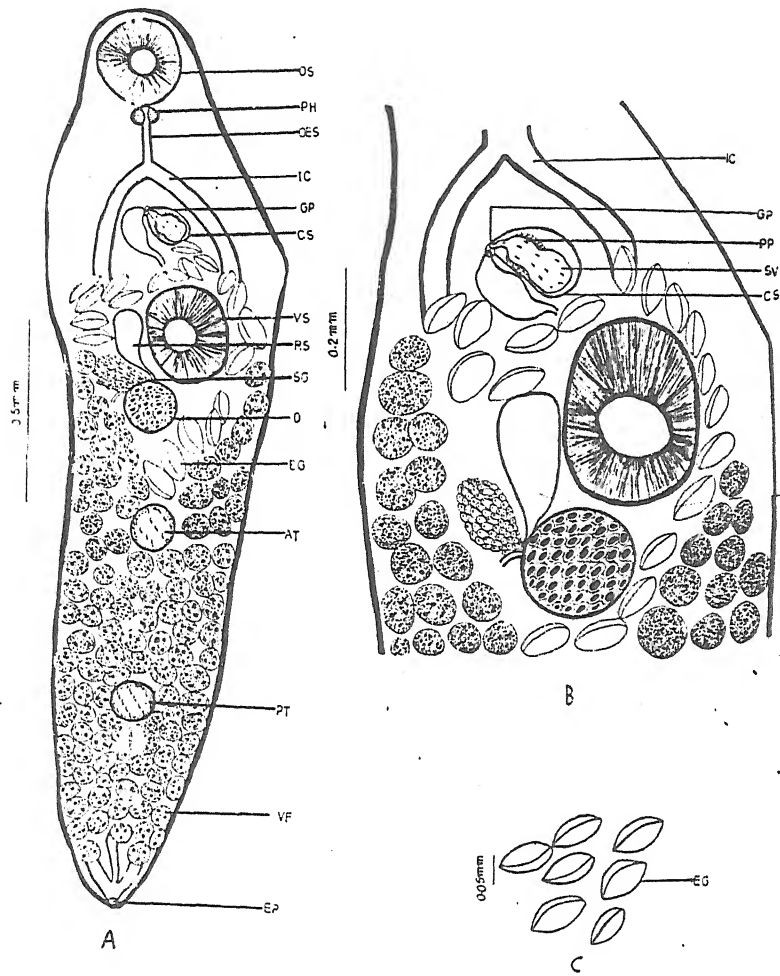
Gupta (1955) established the genus Neopecoelina with N. saharanpurensis for a worm collected from the intestine of Macrones cavasius (Ham.) and Heteropneustes fossilis (Bloch.) Gupta (1955) also described Lucknoides cavasiusi, another new genus, from the intestine of Macrones cavasius (Ham.). Yamaguti (1958) has pointed out the resemblance between the above two genera and has considered Lucknoides as a synonym of Neopecoelina and named Lucknoides cavasius Gupta, 1955 as N. cavasiusi (Gupta, 1955) Yamaguti, 1958. The writer also agrees with Yamaguti (1958) on this issue and regards Lucknoides as synonym of Neopecoelina. Thus so far only three species are reported under the genus Neopecoelina viz., N. saharanpurensis Gupta, 1955, and N. cavasiusi (Gupta, 1955) Yamaguti, 1958 and N. punctatusi Agrawal and Agarwal, 1980.

Present form closely resembles with N. punctatus but differs from it in the position of ovary, position of testes, and in the size of oral sucker, which is smaller than the

ventralsucker. It is therefore, regarded as new species N.
fotedarai n.sp.

The new species is named in the honour of Dr. D.N.
Fotedar, Professor and Head, P.G. Department of Zoology,
University of Kashmir, Srinagar, Jammu and Kashmir.

PLATE 30



Neopeeoelina fotedarai n.sp.*

(Plate No. 30)

Fig. A. Entire worm.

Fig. B. Anterior part of body showing position of cirrus sac, ventral sucker, ovary, receptaculum seminis etc. enlarged (drawn from live specimen).

Fig. C. Eggs enlarged.

Neopeeoelina chandailai n.sp.*

(Plate No. 31)

Host : Mystus vitattus (Cuv. & Bloch.)
Location : Intestine
Locality : Fish market Ghatampur
No. of fish examined : 350
No. of fish infected : 3
No. of specimen collected : 10

Description

Body elongated, smooth, rounded anterior and tapering. Posterior end. Oral sucker subterminal, rounded or oval. Ventral sucker just pre-equatorial, spherical or rounded, slightly smaller than the oval sucker. Pre-pharynx absent. Pharynx spherical muscular. Oesophagus short. Intestinal caeca reaching up to posterior end of body, opens in to excretory vesicle near the excretory pore in common atrium. Testes oval obliquely tandem post equatorial, anterior testis larger than posterior testis. Cirrus sac large oval, sac like, between intestinal bifurcation, encloses. Oval and massive

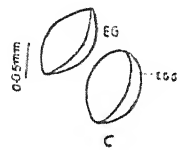
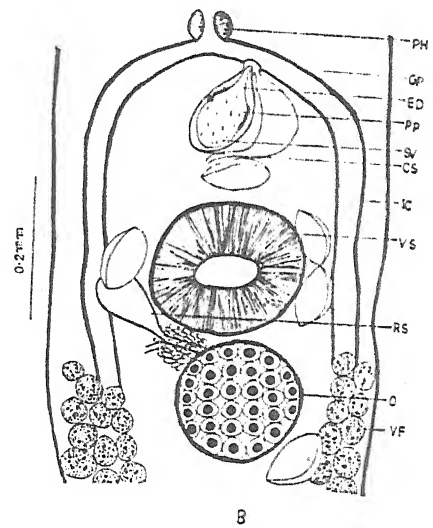
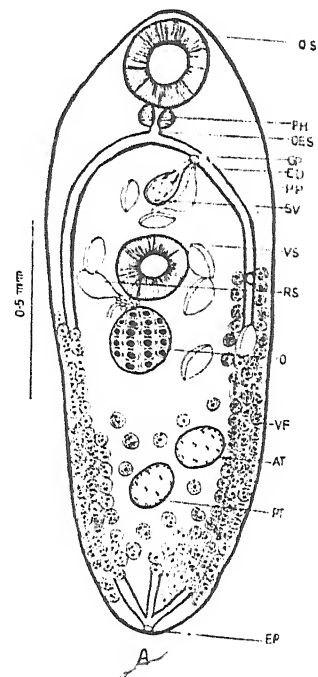
* A full length paper on this species has been communicated for publication in the journal "Indian Journal of Helminthology."

vesicula seminalis, a short pars prostatica, surrounded by number of prostate gland cells. Small ejaculatory duct present. Ovary oval or rounded, equatorial, pre-testicular. Oviduct arises from anterior side of the ovary, opens at the ootype. Receptaculum seminis oval, situated anterior to the ovary. A smaller Laurer's canal opens at ootype, near the opening of receptaculum seminis. Large number of small Mehlis gland cells surrounded the ootype. Uterus limited extends not beyond anterior testis and opens through a short metraterm at genital pore. Eggs oval, operculated. Genital pore situated at the right side of intestinal caeca. Vitelline follicles large, extend up to the middle of ventral sucker to posterior end of body. Two vitelline duct unite to form a vitelline reservoir, opens at ootype through a common vitelline duct. Excretory bladder long tubular, extending behind posterior testis to posterior end of body, opens out side through an atrium.

Measurements

Body length 1.72, width 0.60; oral sucker 0.25 x 0.24; ventralsucker 0.180 x 0.195; pre-pharynx absent; pharynx 0.065 x 0.10; oesophagus 0.02 x 0.35; anterior testis, 0.140 x 0.110; posterior testis 0.140 x 0.10; cirrus sac 0.185 x 0.070; vesicula seminalis 0.07 x 0.045; pars prostatica 0.035 x 0.030; ejaculatory duct, 0.06 x 0.01; ovary 0.185 x 0.165;

PLATE - 31



Neopecoelina chandailai n.sp.*

(Plate No. 31)

Fig. A. Entire worm.

Fig. B. A half part of body showing cirrus sac position of ovary and ventralsucker etc. enlarge (drawn from live specimen).

Fig. C. Eggs enlarged.

FAMILY : PARAMPHISTOMIDAE

Pseudoorientodiscus sengurai n.sp.*

(Plate No. 32)

Host : Puntius sarana (Ham.)
Location : Intestine
Locality : Fish market Ghatampur
No. of fish examined : 350
No. of fish infected : 1
No. of specimen collected : 8

Description

Body elongated, smooth, narrow anterior and broad posterior end. Oral sucker terminal, spherical or rounded, oral pouch long, anteriolateral to oral sucker. Ventralsucker spherical or rounded larger than oral sucker, muscular situated at posterior end of body. Pre-pharynx and pharynx are absent. Oesophagus short thick, oesophageal bulb well developed, muscular. Intestinal caeca terminating up to the anterior level of ventral sucker. Testes entire, spherical or rounded intercaecal, tandem, equatorial, anterior testis larger than posterior testis. Cirrus sac sigmoid, post.

* A full length paper on this species has been accepted for publication in the journal "Indian Journal of Helminthology."

bifurcal, pre-equatorial, vesicula seminalis bipartite, pars prostatica small, surrounded by a large number of prostate gland cells. Ejaculatory duct small. Genitalsucker surrounded the genitalpore, large sub-spherical. Ovary oval, rounded, post-testicular, pre-acetabular, at the level of posterior end of intestinal caeca. Receptaculum seminis absent. Vitelline follicles extending from oesophagealregion up to middle region of ventral sucker at posterior end of body. Uterus arises from ootype, intercaecal and extracaecal, running on lateral side of body up to hind end then turns anteriorly to open at genital pore. Egg ovoid, large, operculated. Genital pore behind intestinal bifurcation surrounded by genitalsucker. Excretory bladder not seen.

Measurement

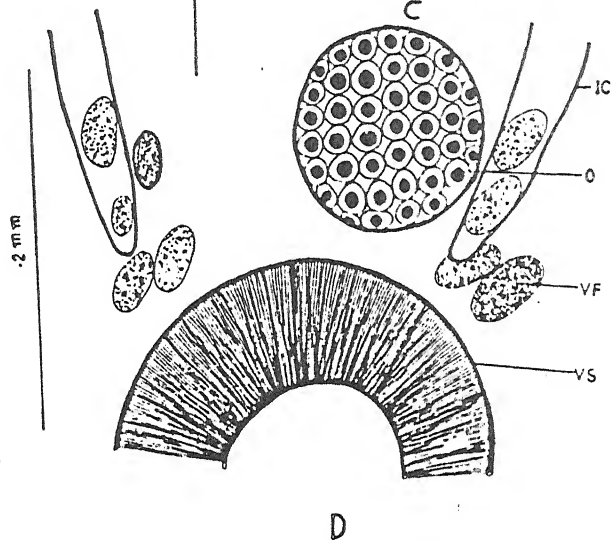
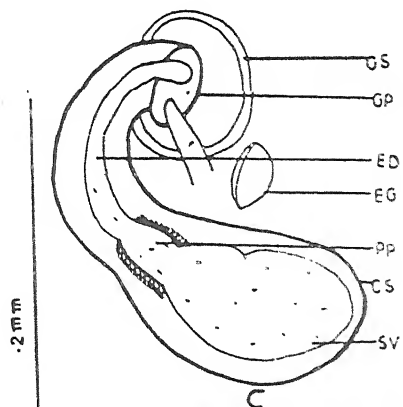
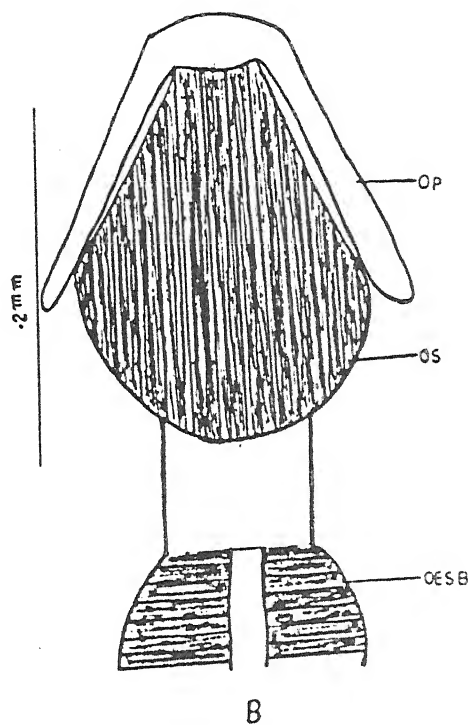
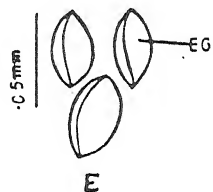
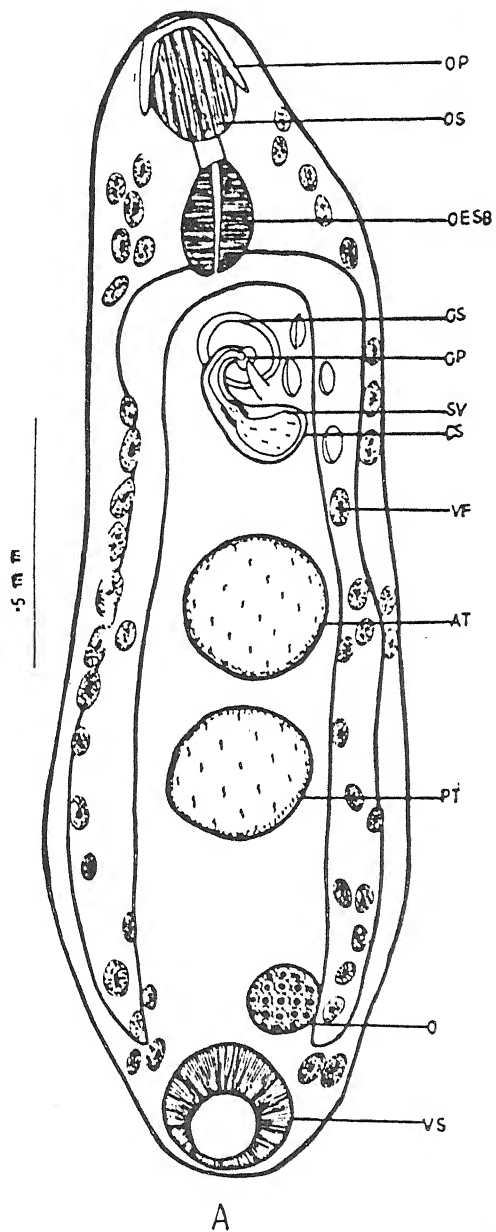
Body length 2.275, width 0.645, oral sucker 0.245 x 0.180; ventral sucker 0.245 x 0.285; oesophageal bulb 0.22 x 0.14; anterior testis 0.280 x 0.280; posterior testis 0.250 x 0.285; cirrus sac 0.375 x 0.080; vesicula seminalis 0.125 x 0.075; pars prostatica 0.045 x 0.020; ejaculatory duct 0.150 x 0.025; ovary 0.125 x 0.135; receptaculum absent; egg 0.070 x 0.035.

Discussion

The present form belongs to genus Pseudorientodiscus Agrawal and Sharma, 1989. It differs from the known species P. laximibaii in the position and size of the ovary, in the shape and size of testes, in the extension of intestinal caeca which is anterior margin of posterior sucker and in the extension of vitelline follicles from oesophageal level to middle level of the posterior sucker.

Therefore, a new species P. sengurai n.sp. The new species is formed for its reception. The new species is named after the name of the river from which the host is collected.

PLATE - 32



Pseudoorientodiscus sengurai n.sp.*

(Plate No. 32)

- Fig. A. Entire worm.
- Fig. B. Anterior part of body showing oralsucker and oesophageal bulb enlarged (drawn from live specimen)
- Fig. C. Cirrus sac enlarged (drawn from live specimen).
- Fig. D. A part of posterior end of body showing position of ovary enlarged (drawn from live specimen).
- Fig. E. Egg enlarged.

KEY TO LETTERING IN FIGURES

AS	Anterior sucker
AT	Anterior testis
CS	Cirrus sac
EB	Excretory bladder
ED	Ejaculatory duct
EG	Egg
EP	Excretory pore
GP	Genital pore
GS	Genital sucker
I	Intestine
IC	Intestinal caecum
O	Ovary
OES	Oesophagus
OESB	Oesophageal bulb
OP	Oral pouch
OS	Oral sucker
PG	Prostate gland cells
PH	Pharynx
PP	Pars prostatica
PPE	Prepharynx
PT	Posterior testis
RS	Receptaculum seminis
SP	Spines
SV	Vesicula seminalis
T	Testis
TEN	Tentacle
U	Uterus
VF	Vitelline follicles
VFD	Vitelline follicular duct
VS	Ventral sucker

KEY TO LETTERING IN FIGURES

AS	Anterior sucker
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PP	Pars prostatica
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PT	Posterior testis
RS	Receptaculum seminis
SP	Spines
SV	Vesicula seminalis
T	Testis
TEW	Tentacle
U	Uterus
VF	Vitelline follicles
VFD	Vitelline follicular duct
VS	Ventral sucker

SUMMARY

SUMMARY

Fish are the main source of Protein, Vitamins, Fat and large amount of calcium, phosphorous, oil and other elements. Fishes are delicious and easily digestable. Fish meals contains 13 to 30% protein provides 300 to 1600 calories energy and have a good taste. Therefore, a large number of fresh water brankish and marine fishes are regularly captured, in various part of the world. Only in India 7.5 millions people depend on fish and fishery while twenty fifth thousand peoples are engaged in ancillary vocation, such as net, basket, and ice making, fish-processing and transportation etc. Specially trematodes as a whole are considered one of the major groups of Helminth parasites infesting fishes. There is also great diversity among the digenetic trematodes. The classification of large number of species is unsettled, and our knowledge is still incomplete, even in regards to the adult trematodes and more inadequate in regards to their life cycle and larval stages from time to time. Indian workers have worked out the trematode fauna of fishes in various regions of the country. Therefore, district Kanpur rivers, reservoirs pond fishes were examined for helminth fauna. Though a collection of trematodes, cestodes, nematodes and acanthoce-

phalans has been made but in the present thesis studies on the digenetic trematode parasites only are being presented.

The present thesis entitled "Helminth parasites (Digenea, Trematoda) of fresh water fishes of district Kanpur", efforts have been made to study the morphology and taxonomy of digenetic trematodes infesting the fresh water fishes of Kanpur region, particularly the place, Pokhrayan, Ghatampur, Kanpur Nagar. The survey has been carried out from Feb. 1990 to October 1993. The thesis includes the description of 32 species of which 18 are new to the science (including one subgenus) and 14 are redescribed and added valuable interspecific characters. The observation have been supported by 32 Camera Lucida sketches. the description of each new species has been followed by a discussion for establishing the claim of its being new. Futher a general Introduction, Historical Review, Material and Method, and Host. Parasite list are given in the beginning of thesis. A list of references consulted during the course of present investigations has been given in the last. A check list of digenetic trematodes of fresh water fishes of India is appended at the end of thesis. The cover page including a map of district Kanpur showing various localities surveyed for trematode fauna of fresh water piscine host.

The author is responsible for all the observations diagrams included in the thesis.

Family : Allocreadiidae

Subfamily : Allocreadiinae

Allocreadium duknwai - Agrawal and Sharma 1989

It has been obtained from Rita rita (Ham.) from fish market Kanpur and redescribed. It differs from the original description in having long oesophagus in the size of suckers and extention of vitelline follicles and also in the relative size of various organs. These characters are considered as individual variation.

Allocreadium fasciatusi Kakaji, 1969

It has been obtained from Tor tor (Ham.) purchased from fish market Kanpur and redescribed. It differs from the original from the original description in the ratio and size of ventral and oral suckers in the absence of pre-pharynx and oesophagus size and position of ovary, presence of receptaculum seminis, extention of uterine coil and the extention of vitelline follicles. These characters have been considered as individual variation. For the first time being reported from additional host.

Allocreadium handiai Pande, 1937

It has been obtained from Mystus vittatus (Cuv. & Bloch) purchased from fish market Kanpur and redescribed. It differs from in having posterior testis smaller than anterior testis. Cirrus sac elongated, extending anterior to ventral sucker up to post pharyngeal have long ejaculatory duct. Ovary post acetabular, equatorial, in the relative size of various organs. These characters have been considered as individual variation. It is added as an additional host.

Allocreadium kosia Pande, 1937

It has been obtained from Tor tor (Ham.) purchased from fish market Kanpur and redsdescribed. It differs from size and position of ventral suckers, in the position and shape of testis, anterior testis larger than posterior testis, shape and size of receptaculum seminis. Vitelline follicles extend up pharyngeal region to hind end of body and also in the relative size of various organs. These characters are considered as individual variations.

Allocreadium isoporum Looss 1894

It has been obtained from Rita rita (Ham.) purchased at fish market Kanpur and redescribed. It differs from the original description in the presence of oesophagus, in the

position of testes, in the size and position of ovary, in the position of receptaculum seminis and extension of vitelline follicles, and also in the relative size of various organs. These characters are considered as individual variations.

Allocreadium nicolli Pande, 1937

It has been obtained from Rita rita (Ham.) purchased from fish market at Kanpur and redescribed. It differs from the original description in the presence of oesophagus, absence of prepharynx, in the position of cirrus sac, opening of genital pore, in the position of ovary and in the relative size of various organs. These characters have been considered as individual variation.

Allocreatum thaprai Gupta, 1950

It has been obtained from Barbus sophor (Ham. & Day) from fish market Kanpur and redescribed. It differs from the position and opening of genital pore in the size and shape of receptaculum seminis in the extension of uterus in the relative size of various organs. These characters have been considered as individual variations. It is added as an additional host.

Family : Apocreadiidae

Subfamily : Apocreadiinae

Apocreadium maxicanum Manter, 1937

It has been obtained from Barbus sarana (Ham. & Buch.) purchased from fish market Kanpur and redescribed. It closely resemble with A. maxicanum Manter 1937 but differs from it in having long or short oesophagus, in the position of cirrus sac, in the position and shape of testes, and in the extention of vitelline follicles and relative size of the various organs.

Family : Bucephalidae

Subfamily : Bucephalinae

Bucephalus Kanpurensis n. sp.

It has been obtained from Bagarilus bagarius (Ham. & Skyes) purchased on river bank of Ganga. It differs from 18 species of the Genus Bucephalus Bear 1926 are reported from India. The present form differs from all the known species in the presence of long tubular oesophagus, shape of intestine except B. allahabadensis shape and position of testes, in the position of ovary intertesticular and in the number of vitelline follicles.

The present form closely related to the B. gangaticus and

B. elacatus in the extention and position of the intestine, in the shape and extention of cirrus sac, it also closer to B. indica. B. elacatus, B. aoria in the number and shape of tentacles. It differs from B. vinodi n.sp. also in which body is aspinose and relative size of various organs.

Bucephalus vinodi n.sp.

It has been obtained from Bagarius bagerious (Ham. & Skyes) purchased on river bank of Ganga. It differs from 17 species of the Genus Bucephalus Bear, 1926 are reported from India. The present form differs from all the known species in the presence and shape. Number of tentacles which are bifurcated at the tip, in the extention of vitelline follicles, except in B. allahabadensis.

It is closer to B. allahabadensis, B. bagarius, B. tritentacularia, B. elacatus but differs in the position of cirrus sac and in the position of testes.

It further differs from B. chillene, B. allahabadensis, in the shape of the intestine. It also differs from B. indicus, in the shape of egg and from B. barina, B. bhoratica in the shape and position of cirrus sac and relative size of various organs.

Family : Bucephalidae

Subfamily : Prosorhynchinae

Prosorhynchoides garvai Verma, 1936

It has been obtained from Barbus sophor (Ham. & Day.) purchased fish market Kanpur and redescribed. It differs from in the presence of spines half region of the body in the presence of long tubular oesophagus. Testes tandem, symmetrical, unequal, situated left and right side in the position of ovary in the receptaculum seminis sac like, small, Laurer's canal present. These features appears to be individual variations.

Prosorhynchoides karvei Bholerao, 1937

It has been obtained from Barbus sophor (Ham. and Day.), purchased fish market Kanpur and redescribed differs from in the presence of spines on the body up to cirrus sac region in the absence of oesophagus, in the shape of seminal vesicle, and in the shape and size of anterior testis. These features appears to be individual variation.

Family : Dicrocoeliidae

Subfamily : Neodicrocodiinae

Neodicrocoelium nirupmai n.sp.

It has been obtained from Mystus vittatus (Cuv. & Bloch.)

purchased from fish market Kanpur. It differs from known species in the presence of spines on the oral sucker, in the presence of prepharynx, by having long tubular oesophagus, in the presence of parallel testes and pairing to each other. Vitelline follicles extending from anterior to posterior ends and relative size of various organs.

Family : Hemiuridae

Subfamily : Macradeninae

Macradenina mestacembeli n.sp.

It has been obtained from Mestacembelus armatus (Lac.) purchased from fish market Kanpur. It differs from other known species in the absences of prepharynx and oesophagus position and size of ventral suckers in the position and size of testes in the shape and position of ovary and in the extension of uterus and relative size of various organs.

Macradenina thaprai n.sp.

It has been obtained Mastacembelus armatus (Lac.) from fish market Kanpur. It differs from known only two species in the absence of prepharynx and oesophagus, in the position, shape and size of testes, in the extension and position of cirrus sac, in the opening of genital pore in the shape of

ovary, in the position and size of receptaculum seminis, in the number of vitelline follicles and relative size of organs.

Family : Monarchiidae

Subfamily : Ancylocoeliinae

Ancylocoelium ritai n.sp.

It has been obtained from Rita rita (Ham.) purchased from fish market Kanpur. It differs from known species (only one species is known) by having smooth body, prepharynx long tubular, pharynx prominent muscular. Oesophagus short, intestinal caeca thick V-shaped extend in pre equatorial region or above the ventral suckers. In the position of ovary which is closer to posterior end of ventral sucker in having receptaculum seminis between ovary and anterior testis and relative size of organs.

Family : Opisthorchiidae

Subfamily : Opisthorchiinae

Opisthorchis pedicellata Verma, 1927

It has been obtained from Bagarius bagarius (Ham. & Skyes.) purchased from fish market Kanpur and redescribed. It differs from original description in the ratio of suckers, position of oral sucker which is terminal, in the presence of prepharynx, oesophagus very short or absent, in the extension

of vesicula seminalis from post equatorial of body up to just above the anterior end of ventral sucker and relative size of various organs.

Family : Opistholebetudae

Subfamily : Pycnadeninae

Pycnadena pokhrayansis n.sp.

It has been obtained from Mystus vittatus (Cuv. & Bloch.) from fish market Kanpur. The present form differs all the known species in the position of testes which is equatorial, post acetabular more or less parallel to each other, in the position of ovary which is preacetabular, preequatorial and in the size of eggs and relative size of various organs.

Family : Opecoelidae

Subfamily : Opecoelinae

Neopodocotyle laxmibaii n.sp.

It has been obtained from Labio rohita (Ham.) from fish market Kanpur. It differs from all the known species in the ratio and size of oral sucker and ventral sucker, in the size of posterior testis and in the extension of vitelline follicles, in the position of genital pore it also differs from N. mehrai in the size of oesophagus from N. dayali in the

position of cirrus sac and form N. chauhani, in the shape of the ovary and for the first time L. rohita is added as an additional host and relative size of various organs.

Neopodocotyle hanumanthai n.sp.

It has been obtained Labio rohita (Ham.) from fish market Kanpur. It differs from eight species of the subgenus Neopodocotyle Dayal, 1944, N. spinopora, N. mehrui, N. balliansis, N. dayali in the extension of cirrus sac, size of posterior testis, in the size of ventral sucker and in the opening of genital pore by having short oesophagus and in the extension of vitelline follicles and it differs from N. laxmibaii in the size of oesophagus in the ratio of ventral and oral suckers, in the position of ovary, in the shape of the testes in the extension of vitelline follicles and relative size of various organs.

Family : Opcoelidae

Subfamily : Plagioporinae

Podocorchis gangi n.subgenus, n.sp.

It has been obtained from Channa marulius (Ham. & Buch.) from fish market Kanpur. It differs from genus Podocotyle in the position of genital pore, marginal extracaecal at the oesophagial or middle of oral sucker level, and in the

position of cirrus sac submedian, bifurcal, preacetabular, marginal extend up to the anterior margine of ventral sucker, to oral sucker.

Podocorchis maruli n.sp.

It has been obtained from Channa marulius (Ham. & Buch.) from fish market Kanpur. It differs from known species P. gangi in the position and size of cirrus sac, in the position of genital pore, in the size of ovary and shape of testes and relative size of various organs.

Podocorchis vittatusi n.sp.

It has been obtained from Mystus vittatus (Cuv. & Bloch.) from fish market Kanpur, it differs from new species P. maruli in having large oral sucker than ventral sucker in the shape and position of testes in the extension of vitelline follicles and in the size of eggs which are embryonated and relative size of various organs.

Family : Opcoelidae

Subfamily :

Eucreadium satpalai n.sp.

It has been obtained from Oxygaster bacaila (Ham.) from fish market Kanpur. It differs only six known species in the

absence of prepharynx and oesophagus in the extension of vitelline follicles in the extension of massive thick wrinkled intestinal caeca, in having entire testes except E. gangi and relative size of various organs.

Family : Opecoelidae

Subfamily : Opecoelinae

Nicolla chauhani n.sp.

It has been obtained from Mastacembelus armatus (Lac.) purchased from fish market Kanpur. It differs from 10 known species in having oral sucker larger than ventral sucker, in the position of the ovary in the size of eggs and in the position of testes which are more or less equatorial region and relative size of various organs.

Nicolla dayali n.sp.

It has been obtained from Rita rita (Ham.) purchased from fish market Kanpur. It differs from eleven known species in the presence of spines only in oral sucker region, in the presence of oesophagus, in the position and size of testes, in the extension of vitelline follicles, cirrus sac up to preacetabular and relative sized various organs.

Nicolla skrijabini (Iwanitzky, 1928) Wisniewski, 1933

It has been obtained from Rita rita (Ham.) from fish market Kanpur and redescribed. It closely resemble N. skrijabini but differs from it in the extension of cirrus sac, in the extension of vitelline follicles and in the position of genital pore and relative size of various organs.

Nicolla halichoeri Overstreet, 1969

It has been obtained Rita rita (Ham.) purchased from fishmarket Kanpur. It closely resembles but differs from it in the absences of prepharynx, short oesophagus, in the position shape and size of testes in the extension of vitelline follicles and relative size of various organs and the first time recorded this host.

Nicolla indica Srivastva, 1968

It has been obtained from Rita rita (Ham.) purchased from fish market Kanpur. It closely resembles with N. indica but differs from it, in the absence of prepharynx size and shape of testes, in the position of ovary, in the extension of cirrus sac, in the opening of genital pore and relative size of various organs. It is added as an additional host.

Family : Opecoelidae

Subfamily : Opeodinae

Neopecoelina fotedarai n.sp.

It has been obtained from Mystus vittatus (Cuv. & Bloch.) purchased from fish market Ghatampur. Present form differs from all known species in the position of ovary, in the position of testes in the size of oral sucker which is smaller than the ventral sucker, in the position and size of receptaculum seminalis and relative size of various organs recorded as an additional host.

Neopecoelina chandailai n.sp.

It has been obtained from Mystus vittatus (Cuv. & Bloch.) purchased from fish market Ghatampur. The present form differs from all the known species in the position of genital pore, in the position of testes which are digonally tandem at post equatorial region in the size of ovary and in the size extension of vitelline follicles and relativ size of various organs Mysttus vittatus (Cuv. & Bloch.) is recorded as an additional piscine host.

Family : Paramphistomidae

Subfamily : Orientodiscinae

Pseudorientodiscus sengurai n.sp.

It has been obtained from Puntius sarana (Ham.) purchased from fish market Ghatampur. It differs from the known species P. laximibaii in the position and size of the ovary, in the shape and size of testes, in the extension of intestinal caeca which is anterior margin of posterior sucker, in the extension of vitelline follicles from oesophageal level to middle level of the posterior sucker and relative size of various organs.

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CHECK LIST OF
DIGENETIC TREMATODES OF FRESH WATER FISHES OF INDIA

A Check list of Digenetic trematodes of fresh water fishes of India

Host	Parasites	Author's Record	Locality
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Order: Actinoptergii

Family: Gobiidae
(Cuv.)

<u>Gobius giuris</u> (Cuv. & Val.)	<u>Isopororchis hypsclobagari</u>	Bhalerao, 1936	Hyderabad
	<u>Opegaster belliyai</u>	Pande, 1937	Allahabad
	<u>Allocreadium nicolli</u>	Pandey, 1938	Allahabad
	<u>Phyllodistomum (Catroptoides) paraorchium</u>	Jaiswal, 1957	Hyderabad

Family: Labyrinthoi
(Cuv.)

<u>Anabus testudinus</u> (Ham.)	<u>Allocreadium manteri</u>	Gupta & Puri, 1980	Lucknow
	<u>Pleurogenoides anabasi</u>	Agarwal & Kumar, 1983	Varanasi
<u>Colisa (Trichogaster) fasciatus</u> (Bl. & Schn.)	<u>Clinostomum piscidium</u>	Southwell & Prashad, 1918	Poona
	<u>Diplostomum elongatus</u>	Singh, 1957	Lucknow
	<u>Allocreadium fasciatusi</u>	Kakaji, 1969	Lucknow
	<u>Eucreadium gangi</u>	Pandey, 1970	India*

Family: Nandiadae
Gunther

<u>Nandus nandus</u> (Ham.)	<u>Clinostomum piscidium</u>	Southwell & Prashad, 1918	Poona, Bengal
	<u>Coitocaecum orientalis</u>	Dwivedi, 1970	Jabalpur
	<u>Transversotrema chauhani</u>	Agarwal & Singh, 1981	Lucknow

Host	Parasites	Author's Record	Locality
Family: Ophiocephalidae (Bleeker)			
<u>Channa</u> (<u>Ophiocephalus</u>) <u>gachua</u> (Ham. & Buch.)	<u>Isoparorchis</u> <u>hypselobagri</u>	Bhalerao, 1936	Hyderabad
<u>Channa</u> (<u>Ophiocephalus</u>) <u>marulius</u> (Ham. & Buch)	<u>Isoparorchis</u> <u>hypselobagri</u>	Bhalerao, 1936	Hyderabad
	* <u>Phyllodistomum</u> sp.	Bhalerao, 1937	Poona
	<u>Euclinostomum</u> <u>channai</u>	Jaiswal, 1957	Poona
	<u>Azygia marulii</u>	Jaiswal & Narayan, 1971	*India
	<u>Azygia papillata</u>	Ubgade & Agarwal, 1980	Raipur
	<u>Paradictynogryptus</u> <u>jhansiensis</u>	Agrawal & Sharma, 1989	Jhansi
<u>Channa</u> (<u>Ophiocephalus</u>) <u>punctatus</u> (Bloch.)	<u>Genarchopsis</u> <u>piscicola</u> (Syn. <u>Progonus</u> <u>piscicola</u>)	Srivastava, 1933	Allahabad
	<u>Allocreadium</u> <u>handiai</u>	Pande, 1934	Allahabad
	<u>Isoparorchis</u> <u>hypselabagari</u> (Syn. <u>Genarcho-</u> <u>psis</u>) <u>Progonus</u> <u>piscicola</u>)	Bhalerao, 1936	Hyderabad
	<u>Asymphyllodora</u> <u>indica</u>	Srivastava, 1936	Allahabad
	<u>Orientocreadium</u> (<u>Nizamia</u>) <u>hyderabadi</u>	Dayal, 1938	Hyderabad
	* <u>Clinostomum</u> sp.	Srivastava, 1950	Allahabad
	<u>Genarchopsis</u> (<u>Ophioorchis</u>) <u>indicus</u>	Gupta, 1951	Lucknow & Saharanpur

Host	Parasites	Author's Record	Locality
	<u>Genarchopsis</u> (<u>Ophiocorchis</u>) <u>dasus</u>	Gupta, 1951	Saharanpur
	<u>Orientocreadium</u> (<u>Ganadotrema</u>) <u>phillipai</u>	Gupta, 1951	Lucknow & Saharanpur
	<u>Brahmputrotrema</u> <u>punctata</u>	Gupta, 1955	Assam
	<u>Euclinostomum</u> <u>channai</u>	Jaiswal, 1957	Hyderabad
	<u>Eclinostomum</u> <u>heptacaecum</u>	Jaiswal, 1957	Hyderabad
	<u>Allocreadium</u> <u>ophiocephali</u>	Srivastava, 1960	Raipur
	<u>Azygia asiatica</u>	Simha & Prashad, 1964	Vishakhapatnam
	<u>Genarchopsis</u> <u>punctati</u>	Agarwal, 1966	Lucknow
	<u>Derogenes</u> <u>hyderabadensis</u>	Jaiswal, 1967	Hyderabad
	<u>Brahmputrotrema</u> <u>batesia</u>	Dwivedi, 1970	Jabalpur
	<u>Orientocreadium</u> <u>batrachoides</u>	Pandey, 1972	Lucknow
	<u>Jamunatrema</u> <u>indica</u>	Lal, 1974	Patna
	<u>Haplorchoides</u> <u>pearsoni</u>	Pandey & Shukla, 1976	Lucknow
	<u>Hemipera</u> <u>ovocaudata</u>	Nama, 1978	*India
	<u>Neopodocotyle</u> <u>kulparensis</u>	Agarwal & Agrawal, 1980	Kulpehar District Hamirpur
	<u>Genarchopsis</u> <u>avitellarium</u>	Varma & Sahay, 1983	Ranchi

Host	Parasites	Author's Record	Locality
<u>Channa</u> (<u>Ophiocephalus</u>) <u>striatus</u> (Bloch)	<u>Eucreadium</u> <u>kulparensis</u>	Agarwal & Agrawal, 1984	Kulpahar District Hamirpur
	<u>Hysteroleitha</u> <u>ophiocephalis</u>	Mehra, Kharoo & Dhar, 1984	Allahabad
	<u>Isoparorchis</u> <u>hypslobagri</u>	Bhalerao, 1932	Nagpur
	<u>Genarchopsis</u> (<u>Ophiocorchis</u>)	Srivastava, 1933	Allahabad
	<u>Genarchopsis</u> <u>singularia</u>	Srivastava, 1933	Allahabad
	<u>Clinostomum</u> <u>macrosomium</u>	Jaiswal, 1957	Hyderabad
	<u>Azygia stunkardi</u>	Rai, 1964	Jabalpur
Family: Percidae (Cuv.)			
<u>Ambasis nama</u> (Cuv. & Val.)	<u>Isoparorchis</u> <u>hyslobagri</u>	Bhalerao, 1936	Poona
	<u>Briendralabes</u> <u>krishnakanti</u>	Srivastava & Ghosh, 1967	Dhakuria Lake, Calcutta
	<u>Allocreadium</u> <u>manteri</u>	Gupta & Puri, 1980	Lucknow
Family: Rhynchobdellidae (Bleeker)			
<u>Macrognathus</u> (<u>Rhynchobdella</u>) <u>aculeata</u> (Bloch)	<u>Allocreadium</u> <u>mehrai</u>	Gupta, 1956	Lucknow
	<u>Rhynchocreadium</u> <u>aculeatum</u>	Srivastava, 1962	*India
	<u>Rhynchocreadium</u> <u>singhi</u>	Pershad, 1965	Hyderabad
	<u>Allocreadium</u> <u>mehrai</u>	Kakaji, 1969	Lucknow
<u>Mastacembelus</u> <u>armatus</u> (Lac.)	<u>Isoparorchis</u> <u>hypslobagri</u>	Bhalerao, 1936	Hyderabad
	* <u>Phyllodistomum</u> sp.	Bhalerao, 1937	Poona

Host	Parasites	Author's Record	Locality
	<u>Opegaster mastacembeli</u>	Srivastava, 1937	Jabalpur
	<u>Opegaster mehrai</u>	Harshey, 1937	Allahabad
	<u>Phyllodistomum singhiai</u>	Gupta, 1951	Lucknow & Saharanpur
	<u>Genarchopsis (Ophiocorchis) farucuis</u>	Gupta, 1951	Lucknow & Saharanpur
	<u>Clinostomum mastacembeli</u>	Jaiswal, 1957	Hyderabad
	<u>Allocreadium spindale</u>	Saxena, 1958	Raipur
	<u>Eurostomum armati</u>	Tewari, 1959	*India
	<u>Prosotocus mastacembeli</u>	Agarwal, 1964	Lucknow
	<u>Stomachicola mastacembeli</u>	Verma, 1973	Lucknow
	<u>Orientodiscus mastacembeli</u>	Agarwal & Agrawal, 1979	Jhansi
	<u>Helostomatis bundelkhandensis</u>	Agarwal & Agrawal, 1980	Jhansi
	<u>Orientodiscus orchhaensis</u>	Agarwal & Agrawal, 1980	Jhansi
	<u>Gangatrema ritai</u>	Agarwal & Agrawal, 1980	Jhansi
	<u>Gangatrema chauhani</u>	Agarwal & Kumar, 1981	Varanasi
	<u>Phyllodistomum cephaloglandulata</u>	Pandey & Dwivedi, 1983	Faizabad
	<u>Eucreadium pandeyi</u>	Srivastava, Saxena & Kumar, 1983	Doon Valley
	<u>Dactylostomum jhansiensis</u>	Agarwal & Agrawal, 1988	Jhansi

Host	Parasites	Author's Record	Locality
	<u>Dactylostomum</u> <u>harishaili</u>	Agrawal & Agarwal, 1986	Jhansi
	<u>Opedunculata</u> <u>kashiensis</u>	Maurya & Agarwal, 1989	Varanasi
<u>Mastacembelus</u> <u>pancalus</u> (Cuv. & Val.)	<u>Mimodistomum</u> <u>angusticauda</u> (Syn. <u>Azygia</u> <u>angusticauda</u>)	Stafford, 1913	Hyderabad

Order: Physostomi

Family: Clupeidae

<u>Hilsa</u> (Clupea) <u>ilisha</u> (Ham.)	<u>Lecithaster</u> <u>indicus</u>	Srivastava, 1935	Allahabad
	<u>Lecithaster</u> <u>extralobatus</u>	Srivastava, 1935	Allahabad
	<u>Faustula</u> <u>brevichrus</u>	Srivastava, 1935	Allahabad
	<u>Faustula</u> (<u>Orientophorus</u>) <u>gangeticus</u>	Srivastava, 1935	Allahabad
	<u>Faustula</u> (<u>Orientophorus</u>) <u>ilishii</u>	Srivastava, 1935	Allahabad
	<u>Faustula</u> (<u>Orientophorus</u>) <u>clupii</u>	Srivastava, 1935	Allahabad
	<u>Lecithocladium</u> (<u>Clupenurus</u>) <u>piscicola</u>	Srivastava, 1935	Allahabad
	<u>Faustula</u> <u>chauhani</u>	Gupta & Srivastava, 1960	Allahabad
	<u>Faustula</u> <u>varanasiensis</u>	Agarwal & Kumar, 1977	Varanasi
	<u>Fastula</u> <u>makundi</u>	Agarwal & Verma, 1981	Varanasi

Host	Parasites	Author's Record	Locality
	<u>Faustula indica</u>	Agarwal & Verma, 1981	Varanasi
	<u>Faustula varensis</u>	Kumar & Agarwal, 1984	Varanasi
	<u>Faustula pyriformes</u>	Kumar & Agarwal, 1984	Varanasi
Family: Cyprinidae			
<u>Barilius barana</u> (Gunther)	<u>Helostomatis indica</u>	Verma, 1973	Lucknow
	<u>Allocreadium barnai</u>	Gupta & Verma, 1976	Lucknow
<u>Barilius gatensis</u> (Gunther)	<u>Pycnadena bariliusi</u>	Vasantha Kumari & Srivastava, 1975	Calcutta
<u>Catla catla</u> (Ham.)	<u>Allocreadium catlai</u>	Kakaji, 1969	Lucknow
<u>Cirrhina fulungel</u> (Skyles)	<u>Capalleroia indica</u>	Thapar, 1960	Lucknow
<u>Cirrhina mrigala</u> (Ham. & Val.)	<u>Allocreadium mrigalai</u>	Gupta & Verma, 1976	Lucknow
<u>Labeo calbasu</u> (Ham.)	<u>Helostomatis sakrei</u>	Bhalerao, 1937	Poona
<u>Labeo dero</u> (Ham.)	<u>Astiotrema fotedari</u>	Dhar, 1978	Kashmir
<u>Labeo fimbriata</u> (Gunther)	* <u>Phyllodistomum</u> sp.	Jaiswal, 1957	Hyderabad
<u>Labeo rohita</u> (Ham.)	<u>Allocreadium indicum</u>	Kalyankar & Deshmukh, 1980	Aurangabad
<u>Leuciscus indus</u> (Cuv. & Val.)	<u>Cotylogunoporum orfeum</u>	Thapar & Dayal, 1932	Lucknow

Host	Parasites	Author's Record	Locality
<u>Oreinus sinuatus</u> (Gunther)	<u>Clinostomum schizothoraxi</u>	Kaw, 1950	Jhelum river & Manasbal Lake, Kashmir
	<u>Neascus vetastai</u>	Kaw, 1950	Jhelum river & Manasbal Lake, Kashmir
<u>Oxygaster</u> (Chela) <u>bacila</u> (Ham. & Gunther)	<u>Allocreadium kamlai</u>	Gupta, 1956	Lucknow
	<u>Chelatrema smythi</u>	Gupta & Kumari, 1970	Ropar, Nangal, Ludhiana
	<u>Hamacreadium manteri</u>	Gupta & Kumari, 1970	Ropar, Nangal, Ludhiana
	<u>Eucreadium guptai</u>	Verma, 1973	Lucknow
	<u>Eucreadium thapari</u>	Agarwal & Kumar, 1979	Gorakhpur
	<u>Neoeucreadium mahobaensis</u>	Agarwal & Agrawal, 1981	Mahoba District Hamirpur
<u>Oxygaster</u> (Chela) <u>gora</u> (Ham. & Gunther)	<u>Pycnadena komiai</u>	Srivastava, 1962	* India
	<u>Eucreadium cameroni</u>	Gupta, 1963	Varanasi
	<u>Hamacreadium manteri</u>	Gupta & Kumari, 1970	Nangal, Ropar, Ludhiana
	<u>Eucreadium varanasai</u>	Agarwal & Verma, 1972	Varanasi
<u>Puntius (Barbus) chilinoideus</u> (Cuv. & Val.)	<u>Asymphylogora kedrai</u>	Srivastava, 1951	Hardoi
<u>Puntius (Barbus) debsoni</u> (Day)	<u>Cleptodiscus poonensis</u>	Bhalerao, 1937	Poona
<u>Puntius (Barbus) Sarana</u> (Ham. & Buch.)	<u>Gorgotrema barbus</u>	Dayal, 1938	Lucknow
	<u>Allocreadium makundi</u>	Gupta, 1963	Varanasi

Host	Parasites	Author's Record	Locality
	<u>Neopodocotyle lucknowensis</u>	Gupta & Chakravarty, 1966	Lucknow
	<u>Neopodocotyle dayali</u>	Pandey, 1973	*India
	<u>Neopodocotyle mehrari</u>	Rai, 1971	Gorakhpur
	<u>Asymphyllodora tincae</u>	Rai, 1971	Gorakhpur
	<u>Allocreadium sarani</u>	Gupta & Verma, 1976	Lucknow
	<u>Bundelatrema orchhaensis</u>	Agarwal & Agrawal, 1982	Orchha District Tekamgarh
	<u>Neopodocotyle chauhani</u>	Agrawal & Agarwal, 1983	Jhansi
<u>Puntius (Barbus) shagunio</u> (Mc Clell.)	<u>Eucreadium jhingarani</u>	Srivastava & Singh, 1967	Sone, River, Bihar
<u>Puntius (Barbus) sophore</u> (Ham. & Day)	<u>Asymphyllodora kedari</u>	Srivastava, 1951	Hardoi
	<u>Neopodocotyle mehrari</u>	Rai, 1971	Gorakhpur
	<u>Asymphyllodora tincae</u>	Rai, 1973	Gorakhpur
	<u>Brahmputrotrema gwaliorensis</u>	Dandotia & Bhadauria, 1979	Gwalior
<u>Puntius (Barbus) lali</u> (Ham. & Buch.)	<u>Tetracotyle lali</u>	Pandey, 1970	Lucknow
<u>Puntius (Barbus) tor</u> (Ham. & Buch.)	<u>Isoparorchis trisimilitubis</u>	Southwell, 1913	Bankipur, Calcutta
	<u>Allocreadium mahaseri</u>	Pande, 1938	Allahabad

Host	Parasites	Author's Record	Locality
	<u>Allocreadium</u> <u>dollfusi</u>	Rai, 1962	Ratanagiri, Sihera
	<u>Allocreadium</u> <u>singhi</u>	Rai, 1962	Ratanagiri, Sihera
	<u>Allocreadium</u> <u>hirnai</u>	Rai, 1962	Ratanagiri, Sihera
<u>Rosbora rasbora</u> (Ham. & Buch.)	<u>Paramicrolecithus</u> <u>rasbori</u>	Srivastava & Ghosh, 1967	Assam
<u>Schizothorax</u> <u>esocinus</u> (Mc Cletland)	<u>Phyllodistomum</u> <u>loossi</u>	Kaw, 1950	Kashmir
<u>Schizothorax</u> <u>micropagon</u> (Heckel)	<u>Allocreadium</u> <u>schizothoracis</u>	Pande, 1938	Allahabad
<u>Schizothorax</u> <u>niger</u> (Heckel)	<u>Crepidostomum</u> <u>indicum</u>	Kaw, 1944	Kashmir
	<u>Clinostomum</u> <u>schizothoraxi</u>	Kaw, 1944	Kashmir
	<u>Allocreadium</u> <u>kashmirensis</u>	Fotedar & Dhar, 1974	Kashmir
	<u>Allocreadium</u> <u>fotedari</u>	Dhar & Kharoo, 1984	Kashmir
Sub-family: Cobitidina			
<u>Nemachelius</u> <u>kashmirensis</u>	<u>Allocreadium</u> <u>nemachilus</u>	Kaw, 1950	Kashmir
Family: Muraenidae (Muller)			
<u>Anguilla</u> <u>bengalensis</u> (Grey & Hardev)	<u>Opegaster</u> <u>anguilli</u>	Harshey, 1933	Allahabad
	<u>Nicolla</u> (<u>Crowcrocaecum</u>) <u>allahabadensis</u>	Srivastava, 1963	Allahabad
	<u>Nicolla</u> (<u>Crowcrocaecum</u>) <u>indicum</u>	Srivastava, 1968	Allahabad

Host	Parasites	Author's Record	Locality
	<u>Opegaster</u> <u>jamunious</u>	Srivastava, 1968	Allahabad

Family: Notopteridae

<u>Notopterus</u> <u>chitala</u> (Ham.)	<u>Singhia</u> <u>thapari</u> (Syn. <u>Eclinostomum</u> <u>thapari</u>)	Singh, 1953	Lucknow
<u>Notopterus</u> <u>notopterus</u> (Ham.)	<u>Isoparorchis</u> <u>hypselobagri</u>	Bhalerao, 1936	Hyderabad
	<u>Clinostomum</u> <u>indicum</u>	Bhalerao, 1941	Hyderabad

Family: Scombresocidae

<u>Xenentodon</u> (Belone) <u>belone</u> (Ham. & Gunther)	<u>Elliovitellosum</u> <u>indicum</u>	Gupta & Sharma, 1972	Katanagiri
<u>Xenentodon</u> (Belone) <u>cancilla</u> (Ham. & Val.)	<u>Bucephalopsis</u> <u>karvei</u>	Bhalerao, 1937	Poona
	* <u>Phyllodistomum</u> sp.	Bhalerao, 1937	Poona
	<u>Bucephalopsis</u> <u>karvei</u>	Gupta, 1956	Lucknow
	<u>Roparhynchus</u> <u>nelsoni</u>	Gupta & Sharma, 1972	Katanagiri
	<u>Bucephalopsis</u> <u>chauhani</u>	Chauhan, 1975	*India
	<u>Bucephalopsis</u> <u>geurii</u>	Chauhan, 1975	*India

Family: Siluridae

<u>Bagerius</u> <u>bagerius</u> (Ham.)	<u>Phyllodistomum</u> <u>tripathi</u>	Motwani & Srivastava, 1961	*India
	<u>Bucephalus</u> <u>allahabadensis</u>	Srivastava, 1962	Allahabad

Host	Parasites	Author's record	Localities
	<u>Bucephalus indica</u>	Agarwal & Agarwal, 1979	Naipur
	<u>Opisthorchis gwalioensis</u>	Bhaduria & Dandotia, 1979	Gwalior
	<u>Opisthorchis thapari</u>	Agarwal & Singh, 1980	Lucknow
	<u>Bucephalus purshottami</u>	Agarwal & Kumar, 1985	Varanasi
	<u>Bucephalus bharatica</u>	Agarwal & Kumar, 1985	Varanasi
<u>Bagarius bagarius</u> (Ham. & Skyes)	<u>Opisthorchis pedicellata</u>	Verma, 1927	Allahabad
	<u>Gomtia piscicola</u>	Thapar, 1930	Lucknow
	<u>Opisthorchis pedicellata</u>	Mehra, 1941	Allahabad
	<u>Neobucephalopsis bagarius</u>	Dayal, 1949	Lucknow
<u>Callichrous bimaculatus</u> (Bleeker)	<u>Neopodocotyle indica</u>	Dayal, 1944	Lucknow
<u>Callichrous pabda</u> (Ham. & Buch.)	<u>Pleurogene pabda</u>	Pande, 1937	Allahabad
	<u>Plesiodistomum callichrous</u>	Dayal, 1942	Lucknow
<u>Clarias batrachus</u> (Linn.)	<u>Astiotrema spinosa</u>	Chatterji, 1933	Rangoon
	<u>Masenia collata</u>	Chatterji, 1933	Rangoon
	<u>Orientocreadium clariae</u> (Syn. <u>Ganada Clariae</u>)	Chatterji, 1933	Rangoon
	<u>Orientocreadium (Neoganada) barabankiae</u>	Dayal, 1935	Lucknow

Host	Parasites	Author's Record	Locality
	<u>Astiotrema classia</u>	Dayal, 1938	Lucknow
	<u>Orientocreadium (Ganadotrema) mahendrai</u>	Gupta, 1951	Saharanpur
	<u>Orientocreadium (Ganadotrema) vermai</u>	Gupta, 1951	Saharanpur
	<u>Neopecoelina saharanpurensis</u>	Gupta, 1953	Saharanpur
	<u>Gauhatiana batrachii</u>	Gupta, 1955	Gauhati, Assam
	<u>Masenia dayali</u>	Gupta, 1955	Saharanpur
	<u>Orientocreadium (Neoganada) barabankiae</u>	Jaiswal, 1957	Hyderabad
	<u>Orientocreadium raipurensis</u>	Saxena, 1958	Raipur
	<u>Orientocreadium dayali</u>	Saxena, 1958	Raipur
	<u>Orientocreadium umadasi</u>	Saxena, 1958	Raipur
<u>Clupisoma (Pseudotropius) taakree (Day)</u>	<u>Haplorchoides taakree (Syn. Monorchitrema taakree)</u>	Dayal, 1935	Lucknow
	<u>Bucephalopsis thapri</u>	Dayal, 1948	Lucknow
<u>Eutropiichthys vacha (Ham.)</u>	<u>Haplorchoides (Haplorchis) piscicola</u>	Srivastava, 1935	Allahabad
	<u>Bucephalopsis fusiformis</u>	Verma, 1936	Allahabad
	<u>Bucephalus gangeticus</u>	Srivastava, 1937	Allahabad

Host	Parasites	Author's record	Locality
	<u>Polyorchitrema piscicola</u>	Srivastava, 1937	Allahabad
	<u>Eucreadium eutropiichthyus</u>	Dayal, 1942	Lucknow
	<u>Bucephalopsis simhai</u>	Dayal, 1948	Lucknow
	<u>Phyllodistomum vachius</u>	Dayal, 1949	Lucknow
	<u>Eucreadium eucreadium</u>	Dayal, 1950	Lucknow
	<u>Neobucephalopsis eutropiichthys</u>	Gupta, 1955	Lucknow
	<u>Falliorchis vermai</u>	Srivastava, 1963	Allahabad & Bhagelpur
	<u>Rhipidocotyle vachius</u>	Singh & Sinha, 1976	Dinapore
	<u>Polyorchotrema inglisi</u>	Gupta & Puri, 1980	Lucknow
<u>Gagata cenia</u> (Ham. & Buch.)	<u>Gomtia gagatia</u>	Dayal, 1949	Lucknow
* <u>Glyptosternum</u> sp. (Mc Clelland)	<u>Phyllodistomum folium</u>	Kakaji, 1969	Muzaffarnagar
<u>Heteropneustes</u> (<u>Saccobranchus</u>) <u>fossilis</u> (Bleeker)	<u>Orientocreadium indicum</u>	Pande, 1934	Allahabad
	<u>Clinostomum dasi</u>	Bhalerao, 1942	Hyderabad
	<u>Orientocreadium</u> (<u>Ganadotrema</u>) <u>indicum</u>	Dayal, 1949	Lucknow
	<u>Cephalogonimum heteropneustus</u>	Gupta, 1951	Lucknow
	<u>Eumasenia moradabadensis</u>	Srivastava, 1951	Moradabad
	<u>Masenia fossilisi</u>	Gupta, 1955	Saharanpur
	<u>Neopecoelina saharanpurensis</u>	Gupta, 1955	Saharanpur

Host	Parasites	Author's record	Locality
	<u>Oudhia horai</u>	Gupta, 1955	Manipur
	<u>Phyllodistomum</u> <u>(Catroptoides)</u> <u>indicum</u>	Jaiswal, 1957	Hyderabad
	<u>Emoleptalea</u> <u>loossi</u>	Srivastava, 1960	Raipur
	<u>Emoleptalea</u> <u>dollfusi</u>	Srivastava, 1960	Raipur
	<u>Allocreadium</u> <u>heteropneustusius</u>	Agrawal, 1964	Lucknow
	<u>Phyllodistomum</u> <u>vaehius</u>	Pandey, 1972	Lucknow
<u>Mystus</u> <u>(Macrones)</u> <u>aoria</u> <u>(Skyes)</u>	<u>Bucephalus aoria</u>	Verma, 1936	Allahabad
	<u>Bucephalus</u> <u>tridentacularia</u>	Verma, 1936	Allahabad
<u>Mystus cavaeus</u> <u>(Ham. & Buch.)</u>	<u>Orientocreadium</u> <u>(Macrotrema)</u> <u>macroni</u>	Gupta, 1951	Saharanpur
	<u>Neopecolina</u> <u>cavaeus</u>	Gupta, 1955	Lucknow
<u>Mystus</u> <u>(Macrones)</u> <u>oar</u> <u>(Skyes)</u>	<u>Bucephalus</u> <u>gangai</u>	Maurya & Agarwal, 1988	Varanasi
	<u>Bucephalus</u> <u>dasashwamedhai</u>	Maurya & Agarwal, 1988	Varanasi
<u>Mystus</u> <u>(Macrones)</u> <u>seenghala</u> <u>(Skyes)</u>	<u>Haplorchoides</u> <u>(Haplorchis)</u> <u>attenuatum</u>	Srivastava, 1935	Allahabad
	<u>Bucephalus</u> <u>tridentacularia</u>	Verma, 1936	Allahabad
	<u>Bucephalus</u> <u>indicus</u>	Srivastava, 1938	Allahabad
	<u>Bucephalus</u> <u>gangeticus</u>	Srivastava, 1938	Allahabad
	<u>Opisthorchis</u> <u>pedicellata</u>	Mehra, 1941	Allahabad

Host	Parasites	Author's Record	Locality
	<u>Bucephalopsis thapari</u>	Dayal, 1948	Lucknow
	<u>Haplorchoides macroneus</u>	Dayal, 1949	Lucknow
	<u>Haplorchoides seenghali</u>	Gupta, 1955	Gauhati, Assam
	<u>Haplorchoides macronis</u>	Agarwal, 1964	Lucknow
	<u>Pseudoparamacroderoides seenghali</u>	Gupta & Agarwal, 1968	Lucknow
	<u>Genarchopsis cameroni</u>	Kakaji, 1969	Lucknow
	<u>Cephalogonimus seenghalus</u>	Kakaji, 1969	Lucknow
	<u>Orientocreadium (Macrotrema) seenghalus</u>	Kakaji, 1969	Lucknow
	<u>Godavaritrema indica</u>	Karyakarte & Yadav, 1976	Ratanagiri
<u>Mystus striatus</u> (Bloch)	<u>Stoylotrema multivitellaria</u>	Singh & Prashad, 1979	Patna
<u>Mystus (Macrones) tengara</u> (Cuv. & Val.)	<u>Phyllorchis macronius</u>	Dayal, 1938	Lucknow & Hyderabad
	<u>Haplorchoides attenuatum</u>	Jaiswal, 1957	Hyderabad
<u>Mystus (Macrones) vittatus</u> (Cuv. & Bloch)	<u>Phyllodistomum vittatusi</u>	Gupta, 1955	Assam
	<u>Masenia vittatusi</u>	Agrawal, 1963	Lucknow
	<u>Masenia gontia</u>	Agrawal, 1963	Lucknow
	<u>Pseudoparamacroderoids vittatusi</u>	Kakaji, 1969	Lucknow
	<u>Opisthorchis gorakhpurensis</u>	Rai, 1971	Gorakhpur

Host	Parasites	Author's Record	Locality
<u>Pangasius buchanaani</u> (Cuv. & Val.)	<u>Asymphylogora tincae</u>	Kai, 1971	Gorakhpur
	<u>Haplorchoides mehrai</u>	Pandey & Shukla, 1976	Lucknow
	<u>Oudhia hardayali</u>	Agrawal & Kumar, 1980	Varanasi
	<u>Pseudoparamacroderoide raychaudhurii</u>	Agrawal & Kumar, 1983	Varanasi
	<u>Cephalogonimus nanumanthai</u>	Agrawal and Agarwal, 1984	Jhansi
	<u>Pseudoparamacroderoid keni</u>	Agrawal & Agarwal, 1985	District Hamirpur
	<u>Haplorchoides piscicola</u>	Gupta & Govinda, 1985	Kanpur
	<u>Pseudoparamacroderoides varanasiensis</u>	Maurya & Agarwal, 1989	Varanasi
	<u>Bucephalopsis garuai</u>	Verma, 1936	Allahabad
	<u>Bucephalopsis magnum</u>	Verma, 1938	Allahabad
<u>Pangasius pangasius</u> (Ham. & Buch.)	<u>Neobucephalopsis pseudotropei</u>	Gupta, 1955	Lucknow
	<u>Neobucephalopsis gauhatiensis</u>	Gupta, 1959	Lucknow
	<u>Phyllodistomum tripathi</u>	Agarwal, 1966	Lucknow
	<u>Bucephalopsis garuai</u>	Verma, 1936	Allahabad
	<u>Bucephalopsis confuscus</u>	Verma, 1936	Allahabad
	<u>Protoladorchis burmanica</u> (Syn. <u>Maccallumia burmanica</u>)	Chatterji, 1938	Rangoon

Host	Parasites	Author's record	Locality
<u>Pseudotropius atherinoides</u> (Gunther)	<u>Haplorchoides gangeticum</u> (Syn. <u>Haplorchis gangeticus</u>)	Srivastava, 1935	Allahabad
<u>Rita buchanani</u> (Bleeker)	<u>Orientocreadium indicum</u>	Pande, 1934	Allahabad
<u>Rita rita</u> (Ham.)	<u>Opisthorchis pedicellata</u>	Verma, 1927	Allahabad
	<u>Allocreadium thapari</u>	Gupta, 1950	Hardoi
	<u>Haplorchoides ritai</u>	Gupta, 1955	Assam
	<u>Haplorchoides brahmaputraensis</u>	Gupta, 1955	Assam
	<u>Thaparotrema vittalani</u>	Gupta, 1955	Assam
	<u>Assamia gauhatiensis</u>	Gupta, 1955	Assam
	<u>Eumaseusia ritai</u>	Agarwal, 1964	Lucknow
	<u>Asymphyllodora ritai</u>	Gupta & Agarwal, 1966	Lucknow
	<u>Allocreadium guptai</u>	Kakaji, 1969	Varanasi
	<u>Maseusia ritai</u>	Sircar & Sinha, 1969	Patna
	<u>Neopodocotyle spinipora</u>	Sircar & Sinha, 1969	Patna
	<u>Opisthorchis pedicellata intermedia</u>	Gupta & Kumari, 1970	Ropar, Nangal
	<u>Maseusia yamaguti</u>	Agarwal & Agrawal, 1980	Jhansi
	<u>Gangatrema ritai</u>	Agarwal & Agrawal, 1980	Jhansi

Host	Parasites	Author's Record	Locality
	<u>Oudhia</u> <u>hanumanthai</u>	Tewari, 1983	Meerut
	<u>Oudhia</u> <u>kanungoi</u>	Agarwal & Agrawal, 1984	Hamirpur
	<u>Haplorchoides</u> <u>kherai</u>	Gupta & Govinda, 1985	Kanpur
	<u>Opisthorchis</u> <u>dayali</u>	Agarwal & Kumar, 1987	Varanasi
	<u>Nicolla</u> <u>fotedari</u>	Agrawal & Sharma, 1988	Jhansi
	<u>Nicolla</u> <u>ritai</u>	Agrawal & Sharma, 1989	Jhansi
<u>Wallago</u> (<u>Wallagonia</u>) <u>attu</u> (Bloch)	<u>Isoparorchis</u> <u>hypselobagri</u> (Syn. <u>Isoparorchis</u> <u>trisimilitubius</u>)	Southwell, 1913	Calcutta
	<u>Haplorchoides</u> <u>parini</u>	Chatterji, 1936	Allahabad
	<u>Opisthorchis</u> <u>pedicellata</u>	Mehra, 1941	Allahabad
	<u>Ganeo</u> <u>gobindia</u>	Dayal & Gupta, 1955	Lucknow
	<u>Allogomtiotrema</u> (<u>Gomtiotrema</u>) <u>attu</u>	Gupta, 1955	Lucknow
	<u>Pleurogene</u> <u>attui</u>	Kakaji, 1968	Lucknow
	<u>Bucephalus</u> <u>octotentacularis</u>	Kakaji, 1969	Lucknow
	<u>Opisthorchis</u> <u>caudalispinutum</u>	Bhaduria & Dandotia, 1979	Gwalior
	<u>Haplorchoides</u> <u>srivastavai</u>	Gupta & 1985	Kanpur

Host	Parasites	Author's Record	Locality
Family: Symbranchiidae			
<u>Amphipnous</u> <u>cuchia</u> (Ham.)	<u>Phyllodistomum</u> <u>spatuliformae</u>	Kakaji, 1969	Muzaffarnagar
	<u>Genarchopsis</u> <u>cuchia</u>	Kakaji, 1969	Muzaffarnagar
	<u>Neopodocotyle</u> <u>gorakhpurensis</u>	Agarwal & Kumar, 1986	Varanasi

*Originals not seen